THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XXI. No. 521—24TH YEAR.] LONDON, SEPTEMBER 24, 1872. [Subscription per Annum. { 15s. in Advance. 18s. Credit.] DOUBLE No. Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GEORGE GLOVER & CO.,
Patentees of the Standard Gasometers for the Government, and of the
IMPROVED DRY GAS-METERS.

These Meters are warranted to measure correctly and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured.
To meet the increasing demand, G. GLOVER AND CO. have just entered on possession of extensive premises adjoining their present Works in Ranelagh Road, and they are now prepared to execute promptly, orders to any extent. They keep in stock all sizes of Meters up to 200 lights. In cases of haste, on the receipt of a telegram early on one day, their Meters can be delivered next day in any part of England, and in the large towns in Scotland.
Particulars and lists of prices forwarded on application to—
RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW;
OR
15, MARKET STREET, MANCHESTER.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

JOHN RUSSELL AND CO.,
THE OLD TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.
WAREHOUSES:
69, UPPER THAMES STREET;
COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
16, SOHO SQUARE,
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35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
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JOHN BENT & SON,
WET AND DRY GAS-METER
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STREET-LAMP
MANUFACTURERS,
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ESTABLISHED 1830.
All materials found for the alteration of Public Lamps for lighting with the Rod. Regulators with Lava Burners.

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NEAR NEWCASTLE-ON-TYNE.
WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
London Agents: JAMES LAWRIE & CO.,
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SCOTTISH CANNEL COAL.
J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.
They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.
Messrs. ROMANS, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.
Analysis, prices, and other information will be forwarded on application to their Offices, 8, Forth Street, EDINBURGH; 1, Walbrook, Mansion House, LONDON, or to the "Crown Wharf," Thomas Street, Limehouse, LONDON, where stocks of house, steam, and gas coal are always on hand.
Coal, machinery, fire goods, &c., shipped to all parts of the world.

LESMAHAGO GAS COAL,
AUCHINHEATH COLLIERY,
LESMAHAGO N.B.

JAMES FERGUSON & CO.
LESSEES SINCE 1832.
LONDON AGENTS:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, E.C.
CONTINENTAL AGENTS:
LA COUR & WATSON,
LEITH.

CROLL'S DRY GAS-METER,
(INVENTED & PATENTED IN 1844,)
PRIZE MEDALS.
LONDON, 1851;
NEW YORK, 1853
PARIS, 1855.
COMBINING ALL THE LATEST IMPROVEMENTS,
PRIZE MEDALS
LONDON, 1862;
DUBLIN, 1865;
PARIS, 1867.
MANUFACTURED ONLY BY
THE GAS-METER COMPANY, LIMITED,
238, KINGSLAND ROAD, LONDON, N.E.

MEDAL AWARDED, EXHIBITION, 1862, "FOR GOOD WORK."
THE IMPERIAL TUBE COMPANY, BIRMINGHAM,
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WROUGHT-IRON TUBES & FITTINGS, BRASS & COPPER TUBES,
GALVANIZED & GLASS ENAMELLED TUBES & FITTINGS,
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Twyere Coils for Blast Furnaces, Boring Tubes, Core Bars, Gun-Metal and other Cocks, Boiler Mountings, &c.
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HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

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SILVER MEDAL, PARIS EXHIBITION, 1867.

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ALBION TUBE-WORKS, BIRMINGHAM,

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WROUGHT-IRON TUBES AND FITTINGS

For Gas, Steam, Water, &c.

SOLE LICENSEES AND MANUFACTURERS for the United Kingdom of

THE LAVENANT PATENT ENAMELLED TUBES AND FITTINGS.

LAP-WELDED IRON & HOMOGENEOUS METAL TUBES

For Locomotive, Marine, and Stationary Boilers.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools of all kinds.

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LAMBERT BROTHERS, WALSALL.

ALPHA TUBE & FITTING WORKS

R. LAIDLAW AND SON,

EDINBURGH AND **GLASGOW.**

Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges,

Governors, Test Holders, &c., &c.

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THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

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TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS; SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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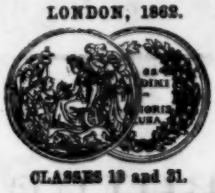
PARIS, 1867.

CLASSES 24 and 53.

WILLIAM SUGG,

GAS ENGINEER.

LONDON, 1862.



CLASSES 19 and 31.

PUBLIC LAMP GOVERNORS, LEVER COCKS, AND POLE LIGHTERS,

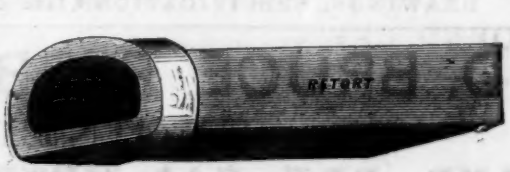
LAMP METERS AND BOXES.

IMPROVED LOWE'S JET PHOTOMETERS.

VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Bars, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

Agent in Ireland—Mr. JAMES FURNESS, 60, LOWER GARDINER STREET, DUBLIN.

Established

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THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON AGENT:

MARCUS BOURNE NEWTON,

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

Possess special advantages for the prompt and efficient execution of large orders for

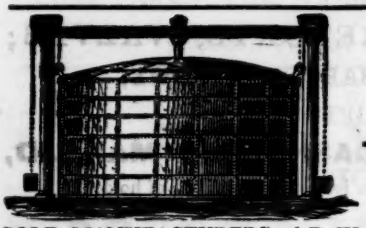
FIRE-CLAY RETORTS & FIRE-BRICKS,

Of every shape and size, and of the best quality; also for their *other productions* in Fire-Clay and Terra-Cotta, including their well-known White and Coloured GLAZED BRICKS.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Retorts in Fire-Clay.

Apply as above, or at their Offices,

3, WESTMINSTER CHAMBERS, VICTORIA STREET, S.W., or at 46½, QUEEN STREET, HULL.



IMPROVED GAS APPARATUS,

FOR CITIES, TOWNS, VILLAGES, &c.,

INVENTED AND MANUFACTURED BY

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD.

SOLE MANUFACTURERS of B. W. THURSTON'S IMPROVED SCRUBBER, CONDENSER, and WASHER, in use in many of the principal Gas-Works on the Continent.

PATENTEES of the IMPROVED COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

ESTIMATES, PLANS, and SPECIFICATIONS PREPARED for BUILDINGS and APPARATUS.

Prospectus, Price Lists, &c., on application.

LONDON OFFICES—57, GRACECHURCH STREET, CITY.

*** *Please address letters to Huddersfield.*

REFERENCES TO UPWARDS OF 300 GAS-WORKS.

DANIEL HOWARD,

Successor to the late BENJAMIN WHITEHOUSE,

(ESTABLISHED IN 1765,)

BOILER AND GASHOLDER WORKS,

Westbromwich, near Birmingham.

MANUFACTURER OF TELESCOPE AND SINGLE GASHOLDERS,

WROUGHT & CAST IRON TANKS

FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS,

And all kinds of GAS APPARATUS.

Wrought-Iron Roofs, Bridges, and Girders; Steam, Hot Water, and Range Boilers; Tanks, Cisterns, &c.,

And all kinds of Wrought-Iron Work.

DRAWINGS, SPECIFICATIONS, and ESTIMATES FURNISHED.

D. BRUCE PEEBLES & CO.,

ENGINEERS,

WET AND DRY GAS-METER MANUFACTURERS,

BRASS FOUNDERS,

AND

GAS APPARATUS MANUFACTURERS,

FOUNTAINBRIDGE WORKS, EDINBURGH,

Patentees and Manufacturers of Wet and Dry Gas-Meters in Tin-Plate and Cast-Iron Cases.

REGULATORS FOR STREET-LAMPS, etc.

For Foreign Gas Companies, and all places where experienced workmen are with difficulty obtained, the Patent Dry Meters, with tongue and groove-jointed valve-covers, are recommended, on account of the ease with which they can be cleaned and kept in repair by any ordinary workman.

STATION-METERS, GOVERNORS, EXPERIMENTING-METERS, PHOTOMETERS, PRESSURE-GAUGES, &c.

D. BRUCE PEEBLES & CO.,

ENGINEERS AND GAS-METER MANUFACTURERS,

FOUNTAINBRIDGE WORKS, EDINBURGH.

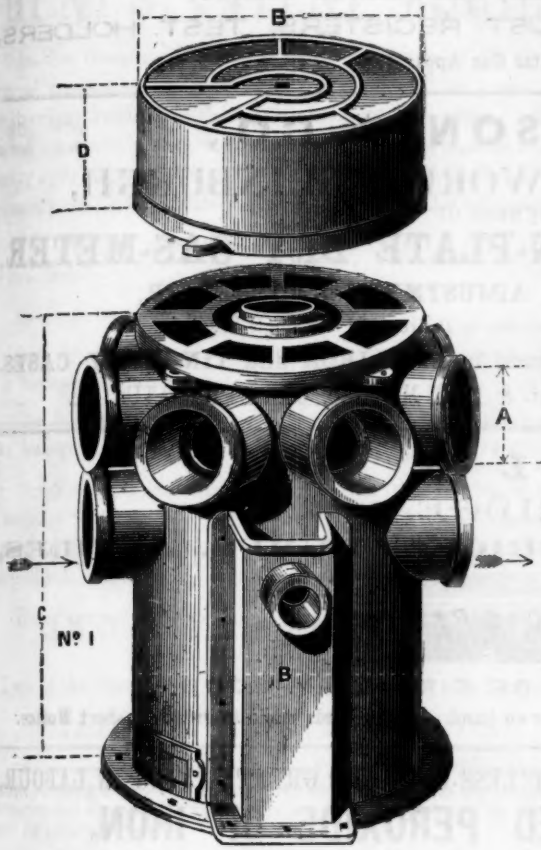
PRICE LISTS ON APPLICATION.

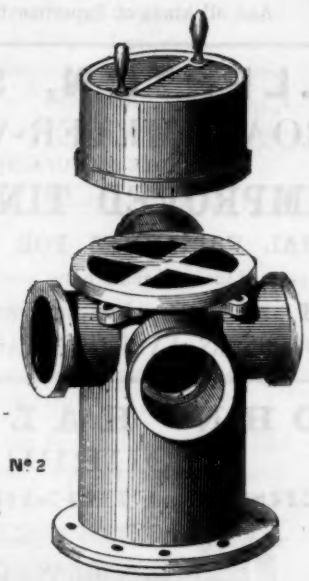
THE THORNCLIFFE IMPROVED CENTRE-VALVE,

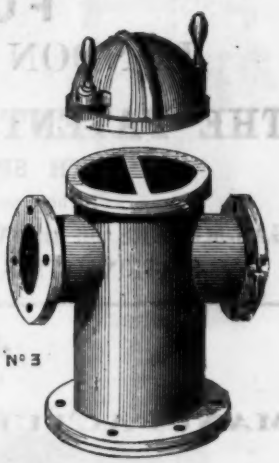
MANUFACTURED BY

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.







Sizes of the

THORNCLIFFE IMPROVED CENTRE-VALVE.

		Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A	Bore of Pipe...	4	5	6	7	8	9	10	12
B	Diam. of Body.	16	20	23	26	28	31	34	40
C	Height of Tank.	33	35	38	43	46	48	51	56
D	Depth of Cover.	8	9	10	11	12	13	14	16
	Total height...	41	44	48	54	58	61	65	72

THORNCLIFFE IMPROVED BYE-PASS VALVE.

SIZES

From 3 ins. upwards.

THORNCLIFFE IMPROVED STOP-VALVE.

SIZES

From 3 ins. upwards.

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

London Office—34, LONDON WALL, MOORGATE STREET, E.C.

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER;

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

And all kinds of Experimental Gas Apparatus.

FULLERTON, SON, & CO.,

LONDON ROAD METER-WORKS, EDINBURGH,

SOLE MANUFACTURERS OF

THE PATENT IMPROVED TIN-PLATE DRY GAS-METER,

WITH SPECIAL FACILITIES FOR ADJUSTMENT AND REPAIR,

The principal parts of the mechanism being accessible by the removal of a single Screw.

GAS-METERS on the WET and DRY principles made in CAST-IRON and TIN-PLATE CASES.

STATION-METERS, GOVERNORS, EXPERIMENTAL & TEST METERS, GAS APPARATUS, &c.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

ECONOMY IN GAS PURIFICATION. A PURER GAS AT LESS COST, AND GREAT SAVING IN LABOUR.

M'DOUGALLS' PRECIPITATED PEROXIDE OF IRON.

The above Oxide is now in use at some of the largest works in the kingdom, and has gained a decided preference, owing to its efficiency, cheapness, and the great saving in labour effected by its use.

It is a pure artificial Hydrated Peroxide, with an addition of only sufficient sawdust to give it the needful lightness or porosity to prevent pressure, and every particle is available for use.

In selecting an oxide, a point more important than its price is to learn the cost of labour entailed in its use. Whilst at large works the cost of labour for purifying, where lime alone or the natural oxides are employed, is 2d. to 3d. per ton of coals, by the use of the above Oxide it is reduced to 1d. to 1½d., owing to the purifier's working so much longer when charged, and to rapid revivification—two points of special importance in the busy season.

For export to Foreign Works it is unequalled, every particle being available, and saves freight over less concentrated materials.

NOTE.—It is important to note that only the Hydrated Peroxide of Iron is useful, simple oxide being worthless. Inferior oxides show a large per centage of simple oxide, but very little Hydrated Peroxide.

M'DOUGALL BROTHERS,

LONDON—158, LEADENHALL STREET, E.C. MANCHESTER—68, PORT STREET.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large Stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all Sizes kept in London at Mr. ALFRED WILLIAMS, Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

TANGYE BROTHERS & HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON,

AND CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM.

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communication being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber, upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

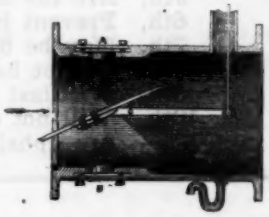
Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The Inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The Valve portion being separate from the Holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the Holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.



Two of the Governors may be seen in action at the London Gas-Works, Nine Elms.

"*Dec.* 25, 1871.

"Gentlemen,—The 18-inch Hunt's Patent Throttle-Valve Governor supplied by you to this Company has been in use for about six months, working very satisfactorily. It obviates entirely the oscillation which sometimes occurs with the ordinary Governors, with the annoyance and danger arising therefrom. The efficiency of this instrument, together with its compactness and lowness of price, ought to ensure its general adoption.

(Signed) "ROBERT MORTON, *Engineer,*
"*London Gas-Works, Nine Elms.*

"Messrs. Tangye Brothers and Holman."

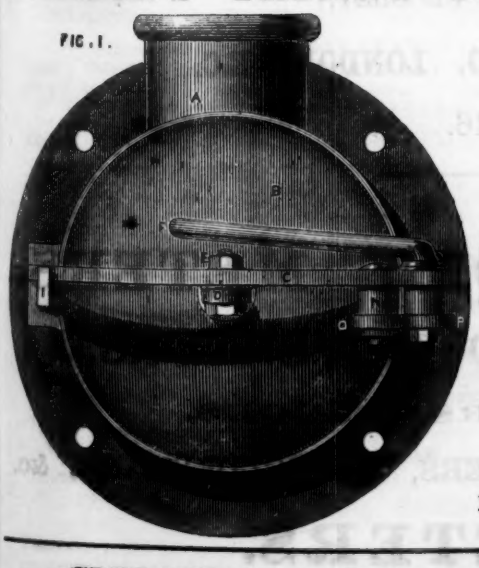
MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

HOLMAN'S

PATENT ECCENTRIC FASTENINGS.

FIG. 1.



"*The Gaslight and Coke Company. Engineer's Office,*
"6, *Westminster Chambers, Nov.* 14, 1871

"Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly,

(Signed) "F. J. EVANS."

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SELF-SEALING RETORT-LIDS

Are adopted by the other Metropolitan Gas Companies, and in the large Provincial Gas-Works at

Liverpool, Dublin, Nottingham, St. Albans, Burslem, Bournemouth, Windsor, Boston, Over Darwen, Manchester, Cheltenham, &c.

CLELAND'S PATENT DIRECT STEAM-JET EXHAUSTERS.

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TRAVELLERS AND HYDRAULIC LIFTS FOR PURIFIER-LIDS, &c.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

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The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

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10th, Will not cost more than one-half for repair that Wet or Water Meters do;
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WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

Aquila (Buenos Ayres).—*Letter received, but no space for it in our present issue.*

Back Pressure.—*We are sorry that your letter was mislaid; it has now been found and shall appear in our next, if you will conform to our invariable rule, and forward your name and address for our own satisfaction.*

S. D.—*Your experience is interesting, but we are sorry to say the letter is too long for insertion, with the present demands upon our space.*

Manchester District Association of Gas Engineers.—*A report of Mr. Wills's lecture will appear in our next.*

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 24, 1872.

Notes upon Passing Events.

To make notes on events when there are no events of the character that come within our scope, is rather difficult. We cannot manufacture anything about the meeting of the Emperors, or the projects of M. Thiers, or the Autumnal Manœuvres, or the last suicide at Waterloo Bridge. The metropolis affords marvellously little to dwell on, when so many of the great men who make domestic politics are on their holidays, or so lately returned from the seaside, the moors, or continental travel, that they have not yet settled down into those serious speeches that afford us texts. Even the Lord Mayor, although his year of glory is rapidly approaching its end, does not in the face of the harvest weather, show the "audacious and tenacious mind," which distinguished his great predecessor, Sir Peter Laurie. Sir Peter promised to put down suicide, and paupers, and several social evils of long standing. He did not succeed, but he made a stout fight. Sir John Gibbons, in a rash moment, threatened to put down the costermongers—those peripatetic pedlars of fruit, fish, and every kind of eatable that gluts the market—on the avowed ground that they blocked up the thoroughfares of the City, and, perhaps, with the secret feeling that they competed disagreeably with the respectable shopkeepers who wear broadcloth, never swear in the streets, and sometimes vote for the Common Councilmen. Sir John has been a commercial traveller himself, and probably, on second thoughts, considered it better not to interfere with the barrow-men, who have so many virtues in the way of audacity, volubility, and industry in common with the bagmen of the olden time. The fact is that, taking the class all round, the costermongers of divers degrees half feed this gigantic and ever-growing London with fish, fruit, and vegetables that would rot in the hands of the wholesale importers without them. The pity is this summer that, not that costermongers stop up the streets with their barrows—a matter for the firm, but not offensive regulation of the police—and make day hideous with their cries—but that there has been so little for them to sell—fish scarce, fruit dear, and so with the round of their leading articles. There are a great many people—the sort of people who rise to temporary authority—who have no sympathy with any class which is not correct in language, demeanour, and dress. A century ago such people never looked below a powdered head and pigtail—the rest were scum! Shopkeepers who deal in perishable food never speculate—they buy just what and just the quantity that is likely to suit their customers. The costermonger who owns a barrow or a cart and pony, and perhaps, if a thrifty man, keeps a small shop in a poor neighbourhood, is essentially a speculator. Whatever is plentiful he invests in, and trusts to the power of his legs and his lungs to dispose of at a profit; now it's herrings, now it's mackerel, now and again a glut of fresh salmon tempts him, or he covers his tray with imported pine-apples at half the price of the shops, or invests in boxes of foreign fruit, and carries each or all to the doors of those who have no time to go shopping. Then, on Saturday night, in the streets still left to him, he joins his brothers and sisters, and makes up the poor man's market. In the suburbs, a superior grade of costermonger, dealing either in fruit and vegetables or in fish, distributes these very necessary provisions to a distance and at a price the respectable shopkeeper cannot touch. We have watched these rude, coarse, but energetic traders rising by degrees from a barrow to a donkey-cart, and from a donkey to a couple of horses, and felt glad that it was not in the power of policeman or Lord Mayor to put such industry down.

London has been within twenty-four hours of a bread famine, of being thrown back on Huntley and Palmer, Peek and Frean, and the produce of their celebrated biscuit manufactures—like a crew at sea, before the modern luxuries of "soft tack" had demoralized our sailors. The questions of time and wages seem likely to be settled on reasonable terms. The wages are a question men and masters understand, but that a working day or night of more than twelve hours is unreasonable in these days of short time, any one can understand. The question was much more serious to the working than to the middle classes. Well-to-do people eat very little bread, and have many substitutes beside contrivances that would make stale bread palatable. To the labouring classes fresh, and even hot, bread, is one of the luxuries when properly covered with butter, such as it is, that take the place of turtle, venison, and carefully-prepared *entrées*. When a large gang of navvies settle down to work in a new district, one of the first signs is that the butcher kills an extra number of beasts, and the baker comes round to tell his genteel customers that if they like they may have hot rolls, as he is taking them every morning for the navvies breakfasts. Years ago, when a special brick-oven heated with faggots was considered essential for baking good bread, it was not astonishing that town dwellers gave up bread-making, as they did home brewing, but now that close stoves are so common that every close stove has, or ought to have, a good oven available, without extra expense, and when, too, flour of a quality, whiteness, and strength unknown to our fathers is to be had at the corn mart of every seaport, it is surprising that more housekeepers do not fall back on the luxury of home-baked bread. Miss Acton's, and a score of other cookery books, will teach the whole art and mystery to any intelligent girl without prejudices. Perhaps the objection lies in the fact that the

tastes of the multitude have been so debauched that they prefer baker's mixture to the product of good flour, water, and yeast.

When Lord Melbourne was asked why he associated with a certain very stupid person, he replied: "He is of the greatest value to me, he is my foolometer. From him I learn what is the opinion of that large constituency, the fools, on any subject." The Social Science Congress performs a parallel office—it is the grand Cave of Adullam for every one with a crotchet. At its meetings bores are encouraged and sometimes even applauded. Now and then there is a halfpenny worth of bread in the gallons of sack, and some one who is not a political or literary failure really makes a sensible suggestion, or reports and records facts worthy of being studied. Lord Napier of Eskdale has proved his ability as a diplomatist and as a governing administrator, but he has not added to his reputation by his address on the land laws of Great Britain. That there is a great deal of room for reform, all but the lawyers who live by the complications of real property law and the pig-headed species who oppose reform of every kind, will admit. But to quote to us the example of India, where the peasant who has not land must starve, or of the Continent peasant farmers, where the landed system has made despotism inevitable, is not to help the changes that are wholesome and practical. The most crying evil of our land system is the unnecessary expense of transferring land either by sale or mortgage. The best paper, that is the most useful, read at the Social Science Congress, was by Sir Robert Torrens, describing the system of registration and conveyance which he had introduced in South Australia, and which had been copied and approved by the three other Australian colonies. Under this system, months are reduced to hours, and the costs from pounds to pence. This is not the place for entering into the details of the Torrens' Land Act. Modifications will doubtless be required for so old a country as Great Britain, but the principles will certainly be adopted whenever the law officers of the Crown are earnest in law reform and have enthusiasm enough to infect the House of Commons. As for the House of Lords, Lord Redesdale will oppose of course, but Lord Cairns, Lord Westbury, and Lord Hatherley, will be found on the side of simplicity and economy. Probably this triumph will be reserved for the next Conservative administration. The right of primogeniture will not survive many sessions, but the effect will be insignificant, considering how very few persons with landed property to leave die intestate. Entail is not confined to land, or rather settlement, which is the same thing in effect. There must be many millions of personal property in the funds, stocks, and shares tied up in strict settlement for unborn generations. Modifications limiting the period for which land can be tied up for the benefit of children not yet born or even contemplated, will pass through the Legislature before very long—as soon as the great public questions, being settled, the ambitious spirits of Parliament look for reputation in retail legislation. But no one can carefully and candidly review the astounding progress of British agriculture within the last 150 years, without acknowledging the benefits the country has derived from that fixity of tenure which is based on hereditary transmission. To take the latest instance, the Duke of Sutherland is carrying out schemes of land improvement and reclamation on 90,000 acres of the wastes of the county from which he takes his title, which would be simply impossible if the property were divided according to the dreams of a certain class of philanthropists, or if an ancestor had not sternly and wisely removed the scattered Highland cotters who starved on the hill-sides, under a climate that only exceptionally ripens corn. In the highly artificial condition of modern agriculture, a partnership between landlord and tenant, on equitable terms, is the only way of thoroughly developing the resources of the soil. But there are signs that farmers will not be content to invest capital in cultivation on the strength of an honourable understanding. Leases are not in favour with the majority of tenant-farmers. A tenant-right law, modified to suit the requirements of English and Scotch cultivation, will be one of the early instalments of land law reform. In the meantime, the labourers, between migration and emigration, are placing themselves in opposition, to make bargains with their employers. What that bargain will be has been outlined by Sir Baldwin Leighton in his arrangements with the 500 labourers he employs—good cottages, with gardens, and allotments of from one quarter to one-third of an acre, on which they could grow vegetables for their families and feed a pig—such land to be charged not at the usual allotment rate, but at its agricultural value. Also to those who had saved money enough (say £20), the run of a cow on grass at 2s. 6d. per week, after the Northumberland custom. Sir Baldwin has also adopted a much more practical plan than the Speaker's, which gives the men who look after them an interest in the increase of the lambs, calves, and pigs; the same to the men who attend to the store cattle. Altogether, the men getting 12s. a week, money wages, are earning other profits (for which, see Sir Baldwin's pamphlet) equal to 6s. 6d. a week. Average farmers cannot, perhaps, follow the more intricate of these arrangements. But such examples spread, and very soon we shall find it as much the custom for farmers to invite labourers to "rest" with them and "be thankful," as it has hitherto been to discourage poultry and pigs, and to let allotments at a "week's notice, either way"—the plan recommended a few years ago by a great light amongst Essex agriculturists and Protectionists. To make it easy in law for a man to buy a freehold house, or a few acres of land, would be to confer a substantial benefit on the nation. As for the taunt of the reverend gentleman who said that he had never heard of a labourer rising to become a tenant farmer, there would have been little in it if it had been true. How rarely do you hear of a farmer making a fortune—not one in a hundred, as compared with shopkeepers. Those labourers who have a talent for making money become cattle-jobbers, dealers in pigs and donkeys; if farmers, they soon leave a pursuit where the capital can only be turned once a year. When all is done between land and labour that can be done without an agrarian revolution, which no sane men with any agricultural knowledge desires, in England and Scotland, trade and manufactures will always be found drawing a large per centage of recruits from the class of little farmers. The peasant farmers of the Continent have not this attraction in the same degree, and a large per centage have a climate that makes mere existence in the open air a thing worth living for. As to waste lands in Yorkshire, as well as in Sutherlandshire, the steam-cultivator and portable manures, the direct creations of large capital applied to agriculture, are solving problems in which many fortunes have been sunk with horse and spade labour.

Dr. Ackland has given the Social Science Congress his latest notions on sanitary legislation. It is satisfactory to find that he does not desire another Act of Parliament on sanitary questions next session; that he is satisfied to let the last Act shake into shape. We do not clearly understand whether Mr. Stansfeld, in the Cabinet, satisfies his demand for an officer of health in that high position. Dr. Ackland's brother, Sir Thomas, originally proposed to find a place for himself as minister of health and agriculture. The remark was sound—that sanitary offices ought not to be filled by men who, having failed professionally, were happy to take refuge in an office with indefinite duties and a fixed salary; but it was not quite so satisfactory when he mentioned as experts, whose services were to be retained at heavy fees, such a thoroughly unpractical person as the sensational chemist, Dr. Frankland, whose greatest feat has been frightening fools by multiplying grains of impurity into tons; and Baron Liebig, whose positive assertions as to the utilization of sewage have proved to be absurdly incorrect, and other agricultural operations.

A long discussion on the "Colonial Question" only led to one sensible suggestion—viz., that the agents-general of colonies should hold the same position as the *chargé d'affaires* of Belgium or Switzerland. The North American provinces are only now trying the experiment of a federation. When the Australian colonies can agree amongst themselves on a uniform tariff, they will still be a long way from holding opinions in common with the Canadians or the dark representatives of the West Indies, although all colonists. At present the "Colonial Question" at Social Science meetings is nothing more than a text for the bunkum of colonists desirous to *pose* as patriots and representative men.

We have looked through Sir John Bowring's address, as president of the Economy and Trade Section, and find the most remarkable thing about it is that the speaker was a man 80 years old. Sir John found our labouring classes very ignorant of the art of cookery, and that our soldiers did not make soups and salads like the French soldiers. It did not occur to the venerable knight that French soldiers learned cookery, not from professors or public teachers, but from their mothers, grandmothers, and fellow comrades—that our people of any class except the highest care very little for soups and less for salads. Then Sir John explained what a convenient thing the post office is, "as he had "learned in the course of his official duties in Egypt, and when "he was minister in China," and how much astonished the Mandarins were at the working of the telegraph—all very pretty octogenarian tea-table tattle, but not quite worth going to Plymouth to hear.

In one of the interminable discussions on the education of women, it was admitted that the present superficial system of boarding-school education was quite equal to the demand, and as good as the mothers of the middle classes desired, and that as a rule they objected to their daughters competing in the Cambridge Examinations. So, instead of abusing the men, the strong-minded female philosophers will do better to set about converting the mothers of England to the value of higher education.

As a matter of course, the discussions included an essay on the

desirability of substituting arbitration for war, a consummation which will come about whenever the losers in actions-at-law pay damages and costs without the fear of the sheriff before their eyes.

Sir John Coleridge took occasion to defend himself from the charge of being an anti-law reformer with his usual force and eloquence; but it is not a speech that is wanted from Sir John, but a series of bills to entirely alter the system that has suited him, his family, and friends so well.

Of course the Social Science Congress could not separate without a paper on railway management. The subject was the uncertain amount of compensation levied on railway companies for the death or injury of passengers by accidents. The reader of the paper advocated some limit or some fixed compulsory payment by way of assurance. If every railway passenger, for a distance exceeding 50 miles, were to pay one penny extra, it would be, financially, easy to secure £1000 for each death, a proportionate sum for injuries, while it might be open to those who considered their lives more valuable to secure a higher payment for an increased premium. But there is not the slightest probability that the Legislature will encourage any diminution of the penalties often so unreasonably levied on railway companies by juries. With respect to the payments for luggage or merchandize lost, stolen, or damaged, it is one tribute to our railway system that no complaints find their way to the newspapers even in this dead season, when every one with a grievance rushes into print, and finds a column reserved at other times for more amusing matter. Should a passenger lose a portmanteau, or a tradesman find a box of eggs smashed *in transitu*, his course is plain; he at once applies to the secretary of the railway company, and, if he has anything like a case, speedily receives liberal compensation. Wonderful stories do railway managers tell of the impositions of ingenious passengers, owners of imaginary lost luggage, and even of demands by tradesmen, for brittle goods packed under very suspicious circumstances—tradesmen whose names figure conspicuously in every advertising sheet. How different is the state of the case on Belgian and German lines, the property of or under the direct control of the respective Governments. There, even when robbery is reduced to a system, there is no redress; the victim is in the same condition as the English sender of a registered letter stolen in the Post-Office. He writes to complain, and gets an official answer; perhaps a second letter if he is very pressing. At any rate, he gets no money compensation. The King of the Belgians, spurred by the letters in the *Times*, did promise to interfere on the part of British travellers plundered on Belgian lines. His Majesty's interference brought out a long letter from the Director-General, who never breathes a word of compensation, but dwells on the folly of careless travellers, and promises special precautions for the future. He was careful not to hint at payment for robberies of even registered baggage. This is the sort of Government management that is held up for our admiration and imitation. The system of Post-Office registered letters applied to luggage and to merchandize. Our Parliament will think twice, think thrice, before it "flies to evils that we know not of." At the moment, the South-Western and Great Western Railways seem completely disorganized by the Autumn Manœuvres and the long sea-side trains. Such are the complaints in the newspapers. Every director, every large shareholder, is made aware of the grievance, and hastens to inquire why trains are unpunctual. The life of the officials is made tolerably uncomfortable. How different would be the case in a Government department, even if a grievance were taken up by powerful members of Parliament, we may learn by the sublime indifference to public opinion with which Mr. Ayrton and his superior, Mr. Lowe, manage their departments—how they snub committees of the House of Commons and the distinguished scientific bodies who rallied in defence of Dr. Hooker.

Mr. Francis Galton is a favourable specimen of the Government official with a certain reputation for scientific knowledge, just the sort of man to be selected. He has been employed to correct the shortcomings of civil engineers, or to take the statistics of the Irish railways, which, as well as the English, he thinks the Government should purchase. A correspondence in the *Daily News*, with Messrs. Negretti and Zambra, the eminent manufacturers of barometers, thermometers, and other scientific instruments, shows that Mr. Galton has been laying down positive instructions for travellers desirous of filling barometer-tubes, "which we," say Messrs. Negretti and Zambra, "ask them carefully to avoid." "In conclusion," they say, "it "would be as well if, when arranging or organizing any scientific "expedition, practical men were consulted in those matters of "detail with which only a workman is acquainted." As a matter of course, the amateur official, Mr. Galton, pooh-poohs the opinions and instructions of Messrs. Negretti and Zambra, as he would those of a Hawkshaw on a railway question or of a Hawksley on a water question, and calls them "simple nonsense." Now, as we before remarked, Mr. Galton is, in intelligence and training, a favourable specimen of the class from whom inspectors and managers of official public works are selected.

Some people never know when to be silent: Sir Charles Adderley is one of them. Feeling sore at some observations made on his conduct, as public advocate of sanitary legislation and bitter opponent of the efforts of the Birmingham people to get rid of their sewage nuisance, in a letter to a contemporary he asserts that the Bill which he failed to defeat on the second reading, but succeeded by a virulent canvass in throwing out on a third reading, after it had passed through committee, was a Bill to carry the sewage by a conduit to the residences of three country gentleman—viz., himself, Sir Robert Peel, and some one not in Parliament—there to be got rid of "by downward filtra-"tion"—the most approved mode of treatment. This Sir Charles calls the creation of "a needless nuisance." It is certainly no defence of flagrant, selfish inconsistency in a man professing to be a patriot. The deputations who waited on Sir Charles before the Bill was introduced, with the view of coming to some arrangement of a very difficult question, were treated with the most pompous insolence. Sir Charles's great anxiety seemed to be to protect "the bones of his ancestors" from the possibility of sewage contamination; to the health of the people of Birmingham he was perfectly indifferent. Sir Charles is a specimen of a class found in all shades of politics. His public virtues are for platform use; he has none for home consumption. His human sympathies in Warwickshire and Staffordshire do not descend below the rank of a baronet. We expect nothing better than selfishness, pure and simple, from Sir Robert Peel; he has never pretended to anything else; but Sir Charles Adderley set up in public life as a saint, a colonizer on religious principles, a Conservative "friend of humanity," in succession to young England. However, like a race-horse, he will be judged by his public running; and, like many well-bred and well-trained animals, be written down "impostor."

GAS LEGISLATION OF 1872.

In the last session of Parliament only nineteen Acts in connexion with gas undertakings received the Royal Assent. Three of these conferred further powers on statutory companies; seven Acts incorporated companies and endowed them with statutory authority; five gave local authorities the power to purchase and maintain gas undertakings; and four gave further powers to local authorities in respect of their gas undertakings. Last year twenty-six Acts in relation to gas matters were passed. The Acts conferring further powers on statutory companies are as under:—

The Gaslight and Coke (Chartered) Company's Act, 1872, gives that company power to raise one million additional capital, by the issue of new ordinary or preference shares, or both; to create debenture stock with a preferential interest not exceeding 6 per cent.; and to borrow under the ordinary restrictions £2500 in respect of every £10,000 of additional capital raised. The interest on debenture stock created under the authority of this Act is to rank *pari passu* with the interest of all mortgages hereafter granted, and is to have priority over the principal moneys secured by such mortgages. The holders of new capital are to be entitled to the same privileges, and, of course, subject to the same liabilities, as the holders of shares or stock in the capital issued previous to the passing of this Act. Money borrowed on the authority of this Act cannot be converted into capital. Existing mortgages are, of course, to have priority; and mortgages granted under this Act will have priority over all other claims on account of debts incurred or engagements entered into; provided that such priority shall not prejudice any claim against the company in respect of any rent-charge granted, or affect any claim or lien in respect of and taken for the purposes of the undertaking or injuriously affected by the exercise of any of the powers conferred by this Act. Section 16 of this Act authorizes the application of the proceeds of the sale of superfluous lands in payment of the expenses of any new works the company are authorized to make. Section 17 makes some further provision for the recovery of charges for gas. By section 18, an incoming tenant cannot be compelled to pay the arrears of an outgoing tenant unless he had expressly agreed to do so, or unless the incoming tenant shall continue the trade or business of the outgoing tenant, having paid to the owner, lessee, or mortgagee, in possession, or to the outgoing tenant, a consideration for so doing; but in the absence of collusion, the company are compelled to supply gas to the incoming tenant on being required by him to do so. By clause 19, the company are forbidden to increase the capacity for the manufacture of the works at Pimlico, formerly belonging to the Equitable Company.

The *Cheltenham Gas Act*, 1872, extends the Cheltenham Gaslight and Coke Company's limits of supply by including several neighbouring parishes. It also reduces the maximum price of gas to 4s. per 1000 feet within the parish of Cheltenham, and to

5s. per 1000 elsewhere. The company are to pay interest on deposited money at the rate of 5 per cent. on every ten shillings for every six months during which the money remains in their hands. Power is given to make a short connecting rail or tramway between the works of the company and the Midland Railway. The Act gives the company power to raise additional capital, to the extent of £80,000, by the issue of ordinary shares or stock, on which only 7 per cent. can be paid. As usual, borrowing powers under the customary restrictions is conferred to the extent of one-fourth of the capital raised. Existing mortgages are to have priority. The interest on debenture stock is to rank *pari passu* with the interest on mortgages, and is to have priority over all principal moneys secured by such mortgages. Moneys borrowed on mortgage or debentures under this Act are to have priority over all other claims against the company, except charges in respect of land. On and from the 1st of January next the pressure in the mains of the company is never to be less than 7-10ths of an inch of water; the illuminating power of the gas is to be 15 candles, tested by the London Argand burner, No. 1, with 6-inch by 1¾-inch chimney, but if at any time the flame tails over the top a 6-inch by 2-inch chimney is to be used. The photometer is to be that known as Letheby's Open 60-inch; the candles are to be uncased. All penalties imposed by the Gas-Works Clauses Act, 1871, are to be paid out of divisible profits, and no deficiency thereby caused is to be made up out of the reserve-fund, or the profits of a subsequent year; but, if it be proved that the defect arose from unavoidable cause or accident, the amount recovered against the company may, if the directors so determine, be ultimately paid out of surplus profits or out of the reserved fund. The testing-place is to be in such a position that all gas supplied to the town shall freely pass from the main or mains through such testing-place. The gas is not to contain more than 5 grains of ammonia, nor more than 30 grains of sulphur (other than sulphuretted hydrogen) in 100 feet. The apparatus employed, and the mode of testing, is to be that prescribed for the time being by the metropolitan gas referees. The apparatus is to be under the control of the Cheltenham Improvement Commissioners, or person appointed by them to test the gas. Power is given to stop up a certain road, and to erect new storeage works, with consent, on lands mentioned in a schedule.

The *Gloucester Gas Act* extends the limits of the Gloucester Gaslight Company by annexing all places and parts of places within three miles, measured in a straight line on a horizontal plane, from the boundary of the old city of Gloucester. Power is given to raise additional capital to the amount of £53,600 in stock, or £10 shares, ordinary or preference, or both. The maximum dividend payable on the former is 7 per cent., on the latter 6 per cent. The new shares or stock must first be offered to present holders, and, if not accepted by them, must be offered for sale by public auction or otherwise in the city of Gloucester in lots of not more than five shares, the reserved price not to be more than the nominal value of the shares. Any money received by way of premium upon the sales is to be applied as capital, but is not to be entitled to dividend. The usual borrowing powers in respect of the new capital are conferred by the Act, and the usual provisions as regards priority of mortgages and debentures are made. The maximum price of gas is to be 5s. within the limits of the existing Act, and 6s. beyond those limits. Power is given to purchase certain land for the erection of works, and, after the expiration of eight years, the manufacture is not to be carried on in the existing works without the consent in writing of the Local Board. The Act gives the usual general powers for the manufacture of fittings, &c., and the conversion of residual products. After the expiration of six months from the passing of the Act, the pressure in the mains is to be 6-10ths from midnight to sunset, and 8-10ths from sunset to midnight; the illuminating power is to be 15 candles tested by the No. 1 London Argand burner. The prescribed testing-place is to be any place within the company's works for the time being. Power is given to purchase by agreement five acres of land in addition to that described in a schedule.

The Acts conferring statutory powers on companies hitherto without them are as follows:—

The *Altrincham Gas Act*, which incorporates and confers further powers on the Altrincham Gas Company. The present capital of the company is £40,000, in £10 shares, paid up to the extent of £7 10s., and power is given by this Act to raise additional capital to the same amount. On the original capital the maximum dividend is 10 per cent., on the new capital 7 per cent. if raised by ordinary shares, or 6 per cent. if preference. The present mortgage debt of the company is only £400, but this Act gives power to borrow £10,000 (including the £400) in respect of the original capital, and £5000 in respect of the new, the latter under the usual restrictions. Debenture stock, with preferential interest not to exceed 6 per cent., may be issued. The customary provisions respecting priority of charges are made. All the general powers as regards the manufacture and supply of gas, and all things necessary to its use, and as to dealing in residual products, are granted. The maximum price of gas is to be 4s. 6d. per 1000 feet; the illuminating power is to be 14 candles. Gas is to be supplied at a pressure of two-thirds of an inch of water from midnight to sunset, and at 2½ inches from sunset to midnight at the works of the company. The testing-place is to be erected within 100 yards of the commencement of the main, and the testings are to be made in accordance with the 28th section of the Gas-Works Clauses Act. The limits of the Act comprise the township of Altrincham and several surrounding townships, all in the county of Chester. All necessary provisions are made for the incorporation of the company and the transference of the undertaking. The Act authorizes the purchase of the undertaking by the Altrincham Local Board at any time, by agreement or arbitration, with the consent of the shareholders in the company and the sanction of the Local Government Board.

The *Barnet District Gas and Water Act* amalgamates the East Barnet Gas and Water Company, the Potters Bar Gas and Coke Company, Limited, and the Barnet Consumers Gas Company, Limited, and incorporates the united undertakings under the title of the Barnet District Gas and Water Company. The amalgamation is to take place on the 30th of September. The original stock and share capital of the united company is to be £85,000, consisting of stock to the amount of £66,500 deemed fully paid up, and 1850 shares of £10 each. The stock is to be distributed among the shareholders of the three companies at the time of the amalgamation in proportion to their respective holdings, and the sums paid up towards the several capitals of the three companies —that is to say, £49,220 to the East Barnet Company, and £5000 to the Potters Bar Company. These two sums are to be distinguished as A capital. To the Barnet Company is allotted £12,280, to be known as B capital. The 1850 shares of the original stock and share capital are to be issued from time to time as if the same were additional capital, and are to form part of the A capital. The B capital is to take a dividend of 1 per cent. less than A, until 10 per cent. is paid on the latter, in which case any further divisible profits are to go to make up a dividend of 10 per cent. on the B capital. When the whole of the original stock and share capital has been expended, the company may, with the consent of three-fifths of the shareholders, raise additional capital by the issue of new ordinary shares or stock to the extent of £50,000. This new capital is to be entitled to a dividend of 10 per cent., but no deficiency can be made up from any source. With the consent of three-fourths of the votes of shareholders present at a meeting convened for the purpose, shares, on which 60 per cent. has been paid up, may be divided into preferred and deferred half shares, in which case 50 per cent., or the whole amount payable, is to be carried to the credit of the deferred half shares. The preferred half is to be entitled to a preferential dividend not to exceed 6 per cent. Any further divisible profits will be applied to payment of dividends on the deferred, but the company cannot pay any greater amount on the two half shares than would have been payable on an undivided share. The dividends on preferred half shares can only be paid out of the profits of the year. Two half shares of either kind vested in the same person will confer the rights of an entire share. No preferred half share can be cancelled or surrendered to the company. The borrowing powers conferred by the Act are as follows:—In respect of the £66,500 original stock of £16,500, of which £11,500 have been already borrowed by the East Barnet Company; in respect of the £13,500 residue of the original stock and share capital, £4600; and in respect of the new capital £2500 for every £10,000 of capital created. The two latter sums can only be borrowed under the usual restrictions. Power is also given to issue debenture stock. It is not said how much of the capital is to be applicable to the purposes of the gas undertaking. From now to the end of 1875 the price of gas within the district of the Barnet Local Board is not to exceed 4s. 9d. per 1000 feet; after 1875, the price is not to exceed 4s. 6d.; and when 9 per cent. is paid on the B capital, the price is to be reduced to 4s. 3d.; a further reduction of 3d. per 1000 being made for every 1 per cent. paid on B capital (under section 30 of the Gas-Works Clauses Act, 1847) in order to make up deficiency of previous dividends. Within a part of the limits beyond the district of the Local Board, the same prices can only be charged, while in other parts 6s. may be charged. The price to public lights within the district of the Board is not to exceed the lowest charged to a private consumer. The works of the Barnet Company are to be discontinued. Gas is to be supplied to consumers at a pressure of 6-10ths from midnight to sunset, and 8-10ths from sunset to midnight. It is to have the illuminating power of 14 candles, tested by a 15-holed Argand burner, with 7-inch chimney, or any other suitable burner capable of burning 5 feet per hour. The testing-place is to be at the works, and the apparatus is to be that prescribed by

the Gas-Works Clauses Act, 1871. All the usual powers of a gas company are conferred. The directors are not to be more than eleven, nor fewer than six. The directors of the three amalgamating companies are to be the first directors of the united company. Power is given to purchase the gas-works and water-works of the British Land Company, and that company may take shares as the consideration.

The *Carnarvon Consumers Gas Act* incorporates a company apparently to take over a private undertaking at present leased to Mr. William Crippin, and then reselling it to the Corporation of Carnarvon. It confers all the general powers of a gas company. The capital is to be £12,000, in £10 shares. Borrowing power to the extent of £3000 is granted, and the company may issue debenture stock. Power is given to purchase certain lands for the erection of works; but, before any land is purchased or works commenced, the company must purchase the interest of Mr. W. Crippin in the existing works. They are first to give notice at the works of their desire to purchase, and if within three months the consideration to be paid has not been agreed upon, arrangements are to be made for an arbitration. Within three months after the consideration has been agreed upon or settled, the price is to be paid, and the lessee is to convey his interest to the company, who are to take possession; but, before an arbitration is proceeded with, the company must have obtained the consent of the lessor or lessors. If the company do not give notice within 18 months, the powers conferred by this Act can only be exercised with the consent of the lessee. If the company acquire the interest of the lessee, they may purchase by agreement the land on which the works are situated, and, if they think fit, continue the manufacture there. Within six months after they have begun to supply gas the company are to provide, at the works, a testing-place with apparatus in accordance with the Gas-Works Clauses Act, 1871. The test-burner is to be a 15-holed Argand, with 7-inch chimney. The gas is to have the illuminating power of 14 candles, and is to be supplied at a pressure of 6-10ths or 8-10ths, within the usual hours. The price is not to exceed 5s. per 1000 feet. If the Corporation of Carnarvon give the company notice within three months of the passing of the Act of their desire to accept a transference of the powers of this Act, they may have it on paying the company all reasonable expenses incurred in the formation of the company and in obtaining this Act; but, after the completion of the purchase by the company, the Corporation must give six months notice of their desire to purchase the undertaking, and the company must sell on terms settled by agreement or arbitration. The Act gives the Corporation power to borrow money for the purchase. The Corporation may appoint a Gas Committee to manage the undertaking, subject to the control of the Corporation. A separate account of their receipts and liabilities under this Act is to be kept. The income derived is to be applied—1, to the expenses of the undertaking, including extensions and improvements; 2, in payment of interest on borrowed money; 3, in repayment of principal money borrowed; and, 4, in diminution of general district rate leviable by the Corporation.

The *Ilfracombe Gas Act* incorporates a new company to purchase the undertaking of the company at present supplying gas to the town and parish of Ilfracombe. The capital of the old company (£4240) has all been expended on the undertaking, together with £850 out of divisible profits. As a consideration the new company are to hand over to the directors of the old 424 shares of £10 each deemed fully paid-up and called A shares, and 85 shares of like value, to be called C shares. The new company assume the mortgage debts of the old. The directors of the old company may sell as many of the above shares as may be necessary to satisfy the liabilities of the company, except the mortgage debts, and the residue are to be distributed rateably among the shareholders of the old company, and then that company is to be dissolved. The capital of the new company will be £20,000, consisting of the shares above-mentioned, and of 1491 shares of £10 each, to be created and called B shares. The profits are to be applied, first, in payment of 4 per cent. on all classes of shares; then in making up deficits in such dividends; and, further, in a manner the final effect of which is to limit the dividend on class A to 10 per cent., and on classes B and C to 7 per cent. Power is given to borrow £4000, of which £1600 may be raised as soon as the purchase is completed, to pay off the mortgage debt of the old company. The remainder can only be borrowed under the usual restrictions. Debenture stock, with preferential interest not to exceed 5 per cent., may be issued. All the general powers of a gas company are conferred by the Act. The gas is to have the illuminating power of 14-candles, tested by a 15-holed Argand with 7-inch chimney, and is to be supplied to the consumer at a pressure of 6-10ths and 8-10ths within the usual hours. The testing-place required by the Gas-works Clauses Act, 1871, is to be at the works of the company. The maximum price is 5s. per 1000.

The *Tamworth Gas Act* incorporates the Tamworth Gaslight and Coke Company, and makes all necessary provisions for the contingencies incidental to the incorporation. The paid-up capital of the original company was £9600, which is to be divided into 480 shares of £20 each. The additional capital is to be £18,840, in £20 shares, which, as they are issued, are to be first offered to the then shareholders. Ten per cent. may be paid on the original capital, and 7 per cent. on the new. The original company had expended on the undertaking £1560 out of the divisible profits, and this amount is converted into loan capital at 5 per cent., to be allotted rateably among the original shareholders. A sum of £1000 had been borrowed by the original company, making, with the foregoing, £2560; and as the borrowing power of the incorporated, in respect of the original capital, is £2700, there only remain £140 to be raised. In respect of the new capital, the company may borrow to the usual extent under the common restrictions. Debenture stock at interest, not to exceed 5 per cent., may be issued. The Act confers all the general powers of a gas company. The gas supplied is to have the illuminating power of 14 candles, tested by the New London or other approved burner. The testing-place is to be erected in some convenient place in the works. The maximum price of gas, with the borough of Tamworth and parts closely adjacent, is to be 5s. 6d., subject to a discount of 5 per cent. for prompt payment. Beyond such limits, the price is not to exceed 6s. 6d.

The *Tonbridge Gas Act* incorporates and confers further powers on the Tonbridge Gas Company, making all the usual provisions for the dissolution of the original company, and the transference of the undertaking with all rights and liabilities to the incorporated company. The original capital fully paid up, £8000, is converted into stock, and to this is added £2000, part of the sum expended on the undertaking out of divisible profits, making £10,000 to be allotted rateably to shareholders in the old company. Power is given to raise additional capital to the amount of £8000 by the issue of shares or stock preferential or ordinary. The dividend payable on the original paid-up capital of £8000 is 10 per cent., on the £2000 capitalized profits 5 per cent., and on the additional capital 7 per cent. Debenture stock with interest not to exceed 5 per cent. may be issued. The Act confers all the general powers of a gas company. The gas is to have the illuminating power of 14 candles, and is to be supplied at the pressure mentioned in previously noticed Acts. The testing-place required by the Gas-Works Clauses Act, 1871, is to be at or near the works. The maximum price is to be 5s. within a mile of the works, and 6s. at any distance exceeding a mile.

The *Wilmslow Gas Act* dissolves and reincorporates the Wilmslow and Alderley Edge Gas Company, Limited, with powers to increase their works and limits of supply. The capital of the original company was £20,000, and this Act gives power to raise additional capital to the same amount by the issue of new ordinary or preference shares of £10 each. The original shares will be vested in the registered proprietors. The dividend on the additional capital is limited to 7 per cent. if ordinary, and 6 per cent. if preference shares. No mortgage debt seems to have been incurred by the original company, so the incorporated company have been granted power to borrow £5000 in respect of the original capital, and a like amount on the additional as it is issued under the customary restrictions. Debenture stock may be issued at interest not to exceed 5 per cent. The gas is to have the illuminating power of 18 candles, and the pressure on the mains is never to be less than 7-10ths. The maximum price fixed is 5s. 10d. per 1000 feet. The Gas-Works Clauses Act, 1871, is incorporated in the Act, and the works of the company are the prescribed testing-place. The Act makes all necessary provisions for the transference of the undertaking, and confers all the usual powers of a gas company.

The Acts authorizing the purchase of gas undertakings by local authorities are as follows:—

The *Birstal Local Board Act* enables the Birstal Local Board to purchase the undertaking of the Birstal Gaslight Company (incorporated) for the sum of £29,506, subject to augmentation or reduction, according to the amount expended by the company on permanent works within the year ending June 30, 1872. When the works are delivered over to the Board the company are to leave a sufficient supply of gas, with coals and materials sufficient for one week. Coals, residuals, meters, &c., are to be taken by the board at a valuation. The Act makes all necessary provisions for the distribution of the purchase-money among the shareholders, the dissolution of the company, and the transference of the rights, powers, and privileges of the company to the Local Board. Outstanding debts previous to June 30, are to belong to the company, but running accounts are to be payable to the Local Board, who are to hand over the proportion due to the company up to the above date, less a commission of 5 per cent. for collection and expenses incurred in recovering the amount. Proper provision is made for the retention of the officers of the company. The Act

confers on the Local Board all the general powers of a gas company. The maximum price of gas is to be 4s. 6d. per 1000 feet, and the charge for the use of a meter is not to be more than 15 per cent. per annum on the outlay incurred in providing and fixing the same. Gas is to be supplied at a pressure of 6-10ths from midnight to sunset, and at 8-10ths from sunset to midnight. The illuminating power is to be 14 candles, the test burner is to be an Argand, consuming 5 feet per hour, and the testing-place is to be at the works of the Local Board. For the purposes of the gas undertaking the Board have power to borrow £40,000 on mortgage of gas-works, gas-works fund, and general district rate. The income of gas-works fund is to be applied to payment of interest on mortgages, to a sinking-fund for paying off mortgages, to maintenance of works, to repayment of moneys advanced out of general district rate, to paying off mortgages, and then the surplus, if any, may be carried to the general district fund.

The *Bolton Corporation Act* confirms an agreement entered into by the Corporation and the Bolton Gas Company, by virtue of which the former become the possessors of the gas undertaking in consideration of paying to each shareholder a perpetual annuity equal to the dividend to which he is entitled, free of income-tax, and a bonus of £2 on each share. If the bonus due to any one shareholder does not amount to £50, he is to be paid at once in cash; but, if it exceeds £50, the Corporation are to pay interest at the rate of 4½ per cent., and pay the principal in seven years time, or sooner if they think fit. All necessary provisions are made for the registration of the annuitants, and the security of the annuities. It is provided that the Corporation shall not redeem or purchase any annuity at a higher rate than £25 for every pound of annuity. For the redemption of the annuities, the Corporation after three years is to create a sinking-fund by setting apart out of the net profits of the gas undertaking a sum equal to one seventy-fifth part of the capitalized value at 25 years purchase of the annuities for the time being subsisting, and are to apply the same to the redemption as opportunity may occur. The Gas-Works Clauses Act, 1871, is incorporated. The illuminating power of the gas is to be 16 candles, the test-burner is to be a 15-hole Argand with 7-inch chimney, or other approved burner with chimney, and the testing-place is to be that at the offices of the company, or other provided at the principal gas-works. The maximum price is to be 4s. within a radius of two miles from the town-hall, and 4s. 6d. beyond. The Corporation take all the usual powers of a gas company.

The *Haworth Local Board Act* confirms an agreement entered into between the Board and the Haworth Gas Company, Limited, whereby the former become the purchasers of the gas undertaking for the lump sum of £6300. When the debts of the company have been paid and the assets distributed it is to be dissolved. All the usual powers of a gas company are granted to the Board. For gas purposes power is given to borrow £12,000 on mortgage of gas-fund, with or without including works, and with or without including general district rate. For repayment of the loan a sinking-fund is to be commenced in 1875, by setting apart from the gas-fund a sum equal to 1-50th of the money borrowed, and in every succeeding year a sum larger by 5 per cent. than in the last preceding year. The maximum price of gas within the district of the Local Board is 5s. 6d., and within the gas limits beyond the district 6s. 6d.; but it is provided that if the ratepayers of Stanbury transfer to the Board the mains supplying that hamlet the price there is only 6d. more than the price for the time being charged in the district of the Board. The Act confers on the Board all the usual powers of a gas company. The illuminating power of the gas is to be 14 candles, tested by an Argand burner, having 15 holes, with 7-inch chimney. The pressure at the consumers is to be 6-10ths and 8-10ths within the usual hours. The testing-place is to be at the works.

The *Hindley Local Board Act* confirms an agreement made between the Board and the Hindley Gas, Coke, Meter, and Fitting Company, for the purchase and sale of the complete undertaking. The consideration is £25,000, to be paid on January 1, 1873. The Act also confirms an agreement made with the Wigan Gas Company for the purchase in 1874 of all the mains, pipes, meters, fittings, &c., of that company existing within the limits of this Act, for the sum of £2000. The Act gives the Board the power to maintain the pipes laid beyond the limits of the Act, and to supply gas by means of them to local authorities and private consumers. A special clause protects the rights of the Wigan Company in certain townships; and another provides the mains, pipes, and plant of the Board lying in portions of the limits of other local boards, may be sold to these latter if they acquire power to supply gas. The Act makes all the usual provisions for the winding up of the company, and the distribution of the assets; it also confers on the Board all the customary powers of a gas company. The illuminating power of the gas is to be 16 candles, tested by a 15-holed Argand, with 7-inch chimney. The pressure at all hours is not to be less than 7-10ths. The maximum price is 4s. 6d. An allowance of 10 per cent. on all charges is to be to consumers of less than 150,000 feet, and 20 per cent. to consumers of that quantity or more. Power is given to borrow £40,000 in respect of the gas undertaking, and to levy a gas-works rate, not to exceed 1s. in the pound. A sinking-fund is to be created after five years, by setting apart annually a sum equal to 1-60th of the money borrowed.

The *Lymm Local Board (Gas) Act* authorizes the Board to purchase the undertaking of the Lymm Gas Company, Limited, for the sum of £5600, makes the usual arrangement for the winding up of the company, and gives the Board all the rights, powers, and privileges usually granted to gas companies. Power is given to borrow on mortgage of gas and other rates £15,000. A sinking-fund is to be created after five years, by setting apart yearly a sum equal to one-thirtieth of the money borrowed. A gas-works rate, not to exceed 1s. in the pound, may be levied, but not if gas is sold for less than the maximum price fixed by this Act—namely, 6s. 8d. per 1000 feet. The illuminating power is to be 16 candles, tested by an Argand with 15 holes and 7-inch chimney. The pressure at all hours is not to be less than 7-10ths. From section 34 of the Act, it would appear that surplus profits of the undertaking must go in reduction of price.

The Acts giving local authorities further powers in respect of their gas undertakings are as follows:—

The *Barrow-in-Furness Corporation Extension and Amendment Act* authorizes the Corporation to acquire certain lands on which to erect and maintain works, and carry on all the manufactures incidental to the production of gas. The Gas-Works Clauses Act, 1871, is to apply to the gas-works of the Corporation under this Act, and also under their Act of 1868. With reference to that Act, the prescribed number of candles is 14; the testing-place is to be at the works; the burner is to be an Argand with 15 holes and 7-inch chimney; and the pressure is to be 6-10ths and 8-10ths, within the usual hours. In connexion with the gas-works, the Corporation take power to erect dwelling-houses for workmen, servants, and other persons in their employ. Power is granted to borrow £45,000 in respect of gas. A sinking-fund is to be created by setting apart yearly a sum equal to 1-75th part of the sum borrowed and remaining unpaid, which is to be invested in Government securities, and increased by accumulation in the way of compound interest.

The *Darlington Extension and Improvement Act* authorizes the Corporation and Local Board to enlarge the existing and erect new works on lands described in a schedule. After twelve months the Local Board are to be subject to the following conditions:—The pressure in the mains is never to be less than 7-10ths; the illuminating power is to be 15 candles; the testing-place is to be at the works; the burner is to be Sugg's London Argand, No. 1, with chimney according to circumstances; the photometer is to be Letheby's open 60-inch, with all proper accessories. The price of gas is not to exceed 5s. Power is granted to use patented inventions (not exclusively), and to supply gas for public purposes gratuitously. The Act gives power to borrow £120,000, but it is not said how much is in respect of gas. Surplus profits of the undertaking may be applied to the purposes of the general district rate.

The *Rochdale Extension and Improvement Act* gives the Corporation power to erect new gas-works on certain specified lands, and provides for the compensation of owners of property within 300 yards, if any such property be depreciated in value by reason of the proximity of the gas-works. The Act incorporates the sections of the Gas-Works Clauses Act, 1871, relating to testing. The prescribed number of candles is 16; the burner is to be Sugg's London Argand, No. 1, with chimney according to circumstances; the testing-place is to be at the works, and the pressure is to be 6-10ths and 8-10ths within the usual hours. The Act gives power to borrow in all £400,000, but it is not said how much is applicable to the purposes of the gas undertaking in connection with which the Corporation take power to build a bridge, to divert the river Roch, and make a new road.

The *Dundee Gas Amendment Act* gives the commissioners power to enlarge and extend their gas-works, and also extends their limits of supply. It further empowers them to supply gas in bulk to local authorities beyond their limits, provided that such supply does not prejudicially affect the supply within their limits. The charge for gas in the extended limits, and beyond to a local authority, is to exceed by 1s. the charge within the limits of the Dundee Gas Act, 1868. The commissioners take power to require from any present or future consumer security for payment of rates. They are also now empowered to manufacture and supply all articles and things connected with gas-works, or with the supply of gas for public or private consumption, and generally to carry on all such operations and business as are usually carried on by gas companies. They are liable to a penalty of £5 for neglecting to supply gas when required to do so, security having

been given. The owners of premises beyond 30 feet of a main must pay for the pipes beyond that distance. The fraudulent abstraction of gas, or making a connection with the pipes without the consent of the commissioners, is punishable by fine. A discount of 5 per cent. may be allowed for prompt payment of charges. Power is given to create a contingent-fund by setting apart 2½ per cent. of the gross revenue, and to borrow £60,000. The annual estimate required by the Dundee Gas Act, 1868, and the charges to be fixed by the commissioners is now not only to include and be sufficient with the other revenues of the commissioners to defray the annual expenditure specified in that Act, but is also to include the interest of money borrowed under this Act, the payment to the sinking-fund, and generally the increased expenditure authorized by the Act; and the ges contingent guarantee rate leviable is to be sufficient to meet any deficiency in the increased expenditure. After five years, a further sum of £1200 a year is to be paid to the sinking-fund for the redemption of the mortgages granted under this Act.

Circular to Gas Companies.

The summary of the gas legislation in the past session of Parliament, which we publish to-day, offers but little for comment. It will be seen that the number of special Acts applied for becomes fewer and fewer, and applications for Provisional Orders under the Gas and Water Works Facilities Act, 1870, more numerous. In the past session only three incorporated companies obtained Acts conferring extended powers, and only seven non-statutory companies procured Acts of incorporation with statutory powers. On the other hand, two companies obtained provisional orders authorizing them to raise additional capital, and ten procured orders, which, being confirmed by general Acts brought in by Government, have now all the force of special enactments. The most important Bill of the Session was that of The Gaslight and Coke (Chartered) Company, which was strongly opposed by the Corporation of the City of London and the Metropolitan Board of Works. It gives the company power to raise a million of additional capital, and borrowing powers to the extent of one-fourth of the new capital. This raises the authorized capital of the company, now including the Western, to the enormous sum (for a gas company) of £4,150,000, and the authorized borrowing power to £913,000. On two points the company obtained a signal triumph over their opponents. They succeeded in getting power to make 10 per cent. on the new capital, and they procured the repeal of section 59 of their Act of 1868, imposed upon them by the City of London, which would have compelled them to apply the proceeds of the sale of superfluous lands and works to the reduction of capital. By this Act the company are allowed to apply such proceeds to the erection of new works. On this victory, the company may be heartily congratulated.

By the Barnet District Gas and Water Act, which had a very narrow escape, and was at the last moment hurried through the two Houses of Parliament in a most remarkable way, the amalgamated company, constituted by the Act, also obtain power to pay a 10 per cent. dividend on new capital—when they can make it. In all the other Acts authorizing companies to raise additional capital, the dividend is limited to 7 per cent., if raised by ordinary, and 6 per cent. if by preference shares. No company this year obtains power to supply gas of lower illuminating power than 14-candles, and the instances in which a higher quality is imposed are but few.

Five Acts authorize the purchase of gas undertakings by the local authorities of the districts or towns on terms which had been amicably arranged between the companies and the authorities. The one Board who sought to obtain compulsory powers of purchase in face of the opposition of the company, or, failing that, to get power to erect competing works, discreetly withdrew their bills, frightened, probably, by the last case of arbitration. In all instances the terms of purchase seem to have been reasonable and fair, and, in the case of the Bolton Corporation, liberal, being perpetual annuities equal to the maximum dividend, free of income-tax, and a bonus of £2 per share. It will be noticed that no one of the Acts transferring gas undertakings to local authorities, compels the application of surplus profits in reduction of price, but allows the net balance to be carried to the general fund. We have repeatedly pointed out the unfairness of this to gas consumers, who are thereby practically taxed twice over. The only place in which such an application could be fairly made would be one in which all ratepayers are gas consumers; but there is probably no town in the kingdom in which this is the case.

The gas accounts of the Corporation of Manchester, which we publish to-day, will, no doubt, set many Corporations and Local Boards longing to get possession of gas undertakings. The fact that in a year characterized by a serious diminution of profits the Corporation should be able to take £30,205 from the gas-fund for improvement purposes is a striking one, and at first sight appears to reflect great credit on corporate management. But, in reality, these £30,205 represent the sum the gas consumers have contributed to the rates beyond their brother ratepayers in the shape of an extra tax. The Corporation have now increased the price of gas so that these large surplus profits may be maintained. The resolution is a most unjust one, and the action of the Manchester Corporation contrasts badly with that of many gas companies who have resolved not to increase their prices under tha present exceptional circumstances. The form in which the accounts are made out does not afford us such ready means of comparison as the accounts of the metropolitan companies of which we lately gave an abstract; but we make out that the gross profit made by the Corporation on total income in the past year amounted to 22·24, and the gross profit per cent. on borrowed money to 15·37 per cent. Taking the Phœnix Company, the nearest to the Corporation in income, the gross profit of that company on total income last year was 34·35 per cent.; but on capital and borrowed money only 9·26 per cent. The comparison, it is true, may not be worth much, but it seems to show that gas might be cheaper in Manchester.

Difficult as it is to form an opinion as to the future of the coal trade, there would appear to be indications that the price of our staple has now reached its maximum, and a decline, more or less rapid, may be anticipated, though probably never a return to former rates. Demand has greatly slackened within the last week or two, the iron trade is less active, and the importations from Belgium and France, insignificant as they have been, may have contributed to moderate the demands of the coal owners. The share which the rise in the cost of labour has had in the production of recent exorbitant prices has been ridiculously small, and, contrary to common opinion, the output, as evidenced in the returns of the quantity of coal exported, has very considerably increased, a conclusive answer to those who assert that the rise in price is attributable to the laziness of the miner. If it were so the owners could afford to pay much higher wages to him to remain idle. The fact appears to be that, while the greatest advance in wages the miner has obtained has only added 6½d. per ton to the cost of coal, the price has been advanced to an amount our readers know too well. The difference has, of course, gone into the hands of the owners and merchants. According to the inexorable laws of trade, high prices will rule as long as excessive demand exists, but the demand appears to be slackening, and, if this continue, prices will soon come down.

In the meantime, on account of the cost of coal, we have to publish the following additional rises in price of gas since our last:—Abingdon, 1s. 5d.; Ashton-under-Lyne, 3d.; Axbridge, 10d.; Anstruther, 2s. 1d.; Barton, 10d.; Bilston, 3d.; Braintree, 1s.; Brentwood, 10d.; Bristol, 6d.; Cardiff, 6d.; Cheadle, 6d.; Chelmsford, 10d.; Coatbridge to 4s. 7d.; Dalton, 1s. 8d.; Droitwich, 1s.; Dukinfield, 6d.; Eccleshill, 5d.; Hanley (British Company) to 3s. 6d.; Helensburgh, 10d.; Hyde, 6d.; Irvine, 10½d.; Kilmarnock, 10d.; Leven, 1s.; Maldon, 10d.; Market Rasen, 5d.; Merthyr-Tydvil, 6d. now, and a probable further increase of 6d. in January next, coal being 28s. per ton at the works; Mitcham and Wimbledon, 6d.; Newport (Dundee) to 10s.; Pembroke Docks and Town, 2s.; Pontypridd, 6d.; St. Andrews, 10d.; Shipston-on-Stour, 10d.; Staleybridge, 4d. and 6d.; Stranraer to 7s. 1d.; Swindon, 25 per cent.; Weston-super-Mare, 3d.; Wokingham, 6d.; and Yarmouth (Great), 1s. Against these we have only to-day to set the resolution of the Police Commissioners of Broughty Ferry, near Dundee, not to increase the price for the present; and of the Halifax Gas Committee, that it is inexpedient to make any advance in the price of gas. The commissioners of the former place supply cannel gas, and it may be taken for certain that the price of cannel will go on increasing.

The letter of Mr. Evans, which we publish to-day, contains a statement which will take most of our readers by surprise. It is the assertion that the two "competent and impartial" gentlemen appointed to act with him as gas referees under the City of London Gas Act, 1868, "were absolutely ignorant of all matters connected with the purification, testing, or supply of gas in any shape." This is a most astounding fact, and reflects the greatest disgrace on the officials of the Board of Trade by whom the appointments were made. The controversy, which has, unhappily, become personal, cannot end here, and for the present we refrain from making any further comment on the matter.

As we are mentioning the referees, we may just say that the public and the companies are for the next six months deprived of any advantage they might derive from Dr. Tyndall's appointment, since the newspapers inform us that the professor has departed for a lecturing tour in the United States for that period.

Mr. Somerville, who had had large experience in the practical manufacture of gas from paraffin oils, sends us a communication on the subject, which will be read with interest. Mr. Somerville's opinion is that only 2-5ths of the oil becomes converted into

permanent gas or vapour, for, as yet, we do not know how much of either, and that the 3-5ths of oil which condense would have to be subjected to higher and higher temperatures to convert it into gas or vapour, or, as more likely, partly one and partly the other. Probably, the inference is not strictly correct. We are not told what is the specific gravity and boiling point of the portion of oil which is condensed. It is not likely that the lighter oils are there, for in the M'Kenzie process the gas will hold the vapours of these in solution, as it were, for a long time. But it is highly improbable that the heaviest hydrocarbon in paraffin oil could withstand the decomposing action of the heat of a gas-retort if the vapour were not withdrawn almost as soon as it is formed. We hope that Mr. Somerville and Dr. Macadam will still further enlighten us as to the composition of this gas from oils. The question is an interesting one to chemists, and is of great importance to gas-makers. Perhaps we may gain some information on the matter when the report of Dr. Odling and Mr. Keates on the Eveleigh process appears. Our readers are indebted to Mr. Somerville for his specification of the oil which he has found to answer best in gas-making. It will be seen that he uses a heavier oil than that Dr. Macadam employed, which may account for the greater condensation.

Mr. Fiddes's communication, "On the Nessler Test for the "Detection and Estimation of Ammonia," is of interest; but, although the test may be employed by gas managers at their works, we do not believe it will be accepted as a legal test. The necessity of operating on very small quantities, the liability to what astronomers call "personal errors," and the frightful way in which these errors become multiplied when calculated for the consumption of 100 feet, stand in the way of its application when penalties are involved. Probably no two persons would ever quite agree in making an estimation of ammonia by the Nessler test.

We commend the letter of Mr. Livesey, which appears among our correspondence, to the serious attention of our country readers. The object sought to be attained by the Gas and Water Companies Association is simple and would prove effective. It would be far better for companies to combine to procure the Act suggested than to go individually to Parliament for power to raise their prices. Union, it must be remembered, is strength.

Mr. R. P. Spice has told the story of the Ryde arbitration in a small pamphlet of 22 pages, to which he has attached a plan of the property for the better information of his readers. The author was engaged for the company, and, naturally enough, insists upon the accuracy of his own valuation. We have no quarrel with him for this; he has a perfect right to insist upon the capitalization of net annual profits, instead of statutory dividends, but he must not expect every one to agree with him. We have not the Ryde Act before us, but from the ordinary language of special Acts, it seems clear that it is perfectly correct to say that all profits realized beyond the amount required to pay the statutory dividends, "belong to the "public in some shape or other." As regards the proposition here insinuated, that shareholders have a right to consideration for dividends they *might* receive on investments they *might* have the opportunity of making, we need only say that we feel certain it is one the author would never entertain if invested with the responsibilities of an arbitrator or umpire. The only parallel for such a claim that we ever heard of was that made by the Turk for a military decoration on account of the prodigies of valour he would have performed if he had been engaged in a certain battle. Again, he blames the editor of this JOURNAL for suggesting that the purchase of the gas-works for £45,000 or £50,000, would be an onerous one for a town of 11,234 inhabitants. Turn to the census tables, he says, and there it will be found that the population of Ryde is 24,344. "True," he adds, "the population of "the *borough* is stated in the census tables at only 11,234." Exactly so, and it is the borough alone that is concerned in the purchase. The money borrowed must be secured upon the mortgage of the gas property and the *borough* rates, and, if a loss were sustained, it must be borne by the *borough*, notwithstanding the unquestioned and well-known fact that the supply of gas is not confined to the *borough* limits. With the last paragraph of the pamphlet we perfectly agree. The Ryde case, as it stands, is "a warning to "Local Boards to see that they have unquestionably the power "to raise the funds, as well as the power to buy gas-works, be-"fore they set out on a crusade against a gas company." We might leave the author here, but as all our readers may not know Ryde, we may quote for their benefit the following spicy description of "this lovely place, which, as viewed from the sea, with its "charming villas *nestling in ambrosial bowers*, terrace above ter-"race, and its gracefully tapering church-spires planted on hills "with sweetest verdure clad, reminds one of Bishop Heber's "words descriptive of other climes—

> Where all the prospect pleases,
> And only man is vile."

The delicate compliment suggested in the above quotation will, we hope, be duly appreciated by the Corporation and inhabitants of Ryde generally. Further trouble has come on the Corporation, for another engineer employed by them has served them with a writ.

Correspondence.

AN EXCELLENT SUGGESTION TO COUNTRY GAS COMPANIES.

SIR,—On behalf of this Association, I request the favour of your kindly inserting this letter in your next publication.

It has been suggested that, as the present unprecedented high price of coal has caused such an enormous increase in the cost of producing gas, and many companies, charging already their full statutory maximum rate, are unable to make any increase of that rate to cover the increased cost, the Association should make application to Parliament, in the ensuing session, for some general provision—such as is in all the recent metropolitan gas Acts—giving power to the Board of Trade to authorize an increase of rate beyond the maximum, upon its being shown to their satisfaction that any company, with due care and management, is unable to make 10 per cent. out of that rate.

The committee, anxious to promote the interests of the companies, purpose holding a meeting in the early part of next month, to consider the subject, and determine what is the best course to pursue.

In the meantime, however, although the justice of such a provision cannot be refuted, as the success of such an application would mainly depend upon the number of cases in which it could be proved that it was really necessary, the committee, before deciding upon any course, would be glad to ascertain more generally than they hitherto have done what the views of the companies are. If, therefore, the companies will communicate their views to the secretary, before the meeting is held, it will greatly assist the committee in forming a decision. WM. LIVESEY, *Secretary to the Association.*

Gas and Water Companies Association,
6, Victoria Street, Westminster, Sept. 23, 1872.

LIFTING PURIFIER COVERS BY HYDROSTATIC PRESSURE.

SIR,—I have perused with much interest Mr. Reid's paper (read at the recent meeting of the North British Association of Gas Managers) "On the application of hydrostatic pressure for lifting the heavy iron covers of purifiers in gas-works," which appears in your last issue. The merit of Mr. Reid's arrangement was very properly acknowledged by the speakers in the subsequent discussion on the paper.

Would you permit me to state that, like Mr. Reid, I was dissatisfied with the ordinary methods of lifting purifier covers, which I found to be generally slow and cumbrous, and that the idea also occurred to me of using hydraulic power. Taking advantage of water under pressure which happened to be available, I devised an hydraulic jib crane, two of which were specially made for us, at Birkenhead, and have been in use here about 12 months with the most satisfactory result.

The machine consists of a cylinder of sufficient length to allow the piston a travel equal to the required lift, the cylinder resting on a pillar mounted with a sole plate, in which is a boss to receive the steel pivot fixed in the under-side of the cylinder. From the top of the cylinder a cast-iron frame is carried up to a swivel neck securely fastened to the wall by a bracket and wall-plate. The water is conveyed to the top of the cylinder, direct from the swivel neck, by means of a small cast-iron pipe. The jib is formed from the bottom of the cylinder and top framing to the required length, and the whole swings from the centre line of cylinder, the jib thus catching the centres of two covers. On each side of the crane, close to the wall, a small pipe is carried up, the two being joined at top by a T-pipe into the swivel neck. Each pipe is provided, at a convenient height, with a wheel valve, one being the pressure, the other the exhaust. To work the machine the exhaust-valve is shut, and the pressure-valve opened; the water being admitted on the *top* of the piston, which is then at the up stroke, forces down the piston, at the same time raising the lid, which may then be swung round out of the way, the whole operation being easily performed in a minute, and, at a cost in labour and water of, practically, *nil*, as the water which is displaced on lowering the lid is received into cisterns, and utilized for feeding the lutes, and damping the purifying material. (In my arrangement two cranes are used for a set of four purifiers, owing to the nature of the building.)

I beg to state, in conclusion, that I was not aware of the existence of any instance whatever in which the application of water-power had been brought to bear for the purpose of lifting purifier lids in gas-works when I devised the machine briefly described above.

EDMUND HARRIS, Engineer.

Wallasey Gas and Water Works, Great Float,
near Birkenhead, Sept. 7, 1872.

THE HYDRAULIC MAIN.

Sir,—I, for one, cannot agree with the remark made by Mr. Peebles in his recent letter, that any of the credit for originating the ideas which led Mr. Livesey to adopt a shallow hydraulic main belongs to Mr. Boyd.

Having been in frequent communication with Mr. Livesey on this very subject for the last two or three years, I can trace the line of thought which led him to adopt this means of obviating that thickening of the tar in the hydraulic main, which, by leading to stopped pipes and pressure on the retorts, has always been the greatest foe to effective carbonization at high heats.

Mr. Boyd, as quoted, says, "there is no use in having 8 or 10 inches of tar always in the hydraulic;" and, further, "it serves no good purpose, but adds weight on the retort-bench, and is a useless tar well." But he omits to see the grand and essential feature—viz., that by causing the immediate removal of the tar as fast as it was deposited, this plan prevented the distillation, and consequent thickening of the same by the action of the hot-blast at the mouth of the dip-pipe.

It was in seeking a cure for this action that Mr. Livesey hit upon the form of main he adopted.

Thus, as a distinct prevention of a known evil, Mr. Livesey alone, and entirely, is entitled to enjoy whatever credit attaches to the modification.

Ratcliff Gas-Works, Wapping. H. E. Jones.

MR. EVANS ON THE SUPPLEMENTAL REPORT OF THE LATE GAS REFEREES.

Sir,—In your last number you have given *in extenso* the supplemental report of the late gas referees on the question of the sulphur purification at the Bow and Beckton works of the Gaslight and Coke Company.

I should not have thought it necessary to notice their report in any way but for the fact of your having published and made certain comments on it, my intention, of course, being to have replied to it in the proper way to the Board of Trade, to whom the report is addressed.

I cannot, however, allow any time to elapse without stating in the strongest terms my astonishment at the report just issued by the late gas referees (or rather two of them—Messrs. Patterson and Pierce), attacking, as it does, not only myself, but the whole body of gas engineers and chemists, and charging them with the grossest ignorance of the methods of purifying gas, and of testing the same.

I believe it is well known in the gas world that I was appointed by the Board of Trade one of the referees under the Act of 1868, as being competent to carry into effect the various clauses relating to the amount of ammonia, sulphur, &c., that should be allowed to the gas companies, and also to settle the mode of testing the gas for its illuminating power, &c. I need hardly say to those who know my antecedents that I was qualified to deal with the subject.

My colleagues were Messrs. Patterson and Pierce, and who (without any reflection on them) were absolutely ignorant of all matters connected with the purification, testing, or supply of gas in any shape. I therefore, with great pleasure, instructed them, and gave them every facility for learning their business, by introducing them to most of the London gas companies, the directors and officers of such companies placing their works at the absolute disposal of the referees, so as to enable them to master as soon as possible the several questions they had to settle. I may also add, in justice to myself, that every appliance for testing gas for its illuminating power, amount of sulphur and ammonia, as now practised by the official testers, was devised by myself, and my colleagues were only too happy to endorse all I suggested. Fortunately, all the tests I laid down have proved to be to the advantage of the public, and a more strict method of testing, I venture to say, could not be adopted.

From reasons which I need not mention, I resigned my appointment as one of the referees, much to the regret of my colleagues; but I still continued my friendly intercourse with them, and gave them, as hitherto, all the information I knew, and, in fact, kept them up to what was doing in the gas world.

Regarding the so-called suggestions of the two referees—as to the sulphur purification by means of lime, &c.—that will be dealt with in my report to the Board of Trade, in which I shall show that Messrs. Patterson and Pierce are in no way warranted in making the statements they have, the facts being, as stated by Messrs. Harris and Trewby—that all the knowledge and information of the result of their experiments was communicated to the two referees, and very cleverly set up in a lengthy report as emanating from themselves.

I think it right to state that Dr. Pole, F.R.S., who succeeded me on my resignation as one of the referees, has officially reported to the Board of Trade his disapproval of the report of his late colleagues.

It will be the endeavour, I am sure, of all the gas companies to assist in every way the researches of the newly-appointed referees in bringing the sulphur question to a satisfactory conclusion; and, as they are all fully competent to deal with it, I have little doubt of a speedy solution.

Chartered Gas Company, Horseferry Road, Sept 16, 1872. F. J. Evans.

THE MANUFACTURE OF GAS FROM OILS.

Sir,—Will you kindly allow me space to notice the paper read by Dr. Macadam before the last meeting of the North British Association of Gas Managers, "On the Employment of Paraffin Oil in the Manufacture of *Coal* Gas," which, no doubt, means in the manufacture of *Oil* Gas, an Irishism, by the way, which might be excusable in Dublin, but is unpardonable when coming from Edinburgh.

Having for the last few years worked with oil in connexion with what is known as the McKenzie process—*i.e.*, the amalgamation of paraffin oil with coal for increasing the illuminating power of coal gas, the experience gained with oils for producing gas may be of some value, and may perhaps help to guide experimentalists, and save others the amount of time and labour which has been bestowed on the subject.

That paraffin oil may be used in the production of gas there is no doubt, but there are great doubts of the results as mentioned by Dr. Macadam being realized. And as the publication of such estimates and deductions which he makes are calculated to mislead, and give professional agitators a weapon to flourish against gas companies, I will endeavour to explain where he is in error.

Having made experiments in the same manner as Dr. Macadam, both by vaporizing the oil and passing the vapour through red-hot coke in retorts, and also by allowing the oil to trickle over the red-hot coke in the retort, and by a number of other arrangements needless to mention at present, and with different kinds of oils, with the view of obtaining the best for gas-making purposes, and with the quality of oil mentioned by Dr. Macadam—*i.e.*, having a specific gravity of 850—my results are somewhat similar, as far as regards illuminating power and condensation; but the tests for condensation and loss of illuminating power were carried further—as being necessary for practical purposes than the third and fourth day—up to the tenth and twelfth day, and with a pressure of 3 and 4 inches of water, and sometimes with 2 and 3 inches of snow on the top of the gasholder; when gas made from that quality of oil, distilled at a high heat, has been reduced from 42 candles to 24 candles on the fourth day, and on the twelfth day to 18 candles, with a loss in volume from 24,400 to 16,200 cubic feet per ton of oil used. The loss in illuminating power is very small after the tenth or twelfth day, but it does increase daily until then. With other paraffin oils of a heavier gravity, the results are better, and the gas is more permanent. Dr. Macadam seems to think the whole of the oil ought to be converted into gas, and that 63,944 cubic feet of gas should be the result of one ton of oil, and remarks: "The apparent loss, therefore, when the oil is transformed into gas, is due to condensation of the oily vapours, and such condensed oil may be employed *over and over* again until it is entirely converted into available and permanent gas."

Now this is a mistake when applied to oil distilled at a *high* heat, for if that three-fifths of condensed oil was again subjected to the same *high* heat, it would be found to condense again on arriving at the condenser, which it is presumed will be kept at the same temperature; and the only way to get that condensed oil made into a gas, would be to distil it at a much greater heat, or an extraordinary high heat, so as to alter its specific gravity, and raise the temperature of the condenser.

This is not practicable, and, if it was, what would become of it in the gasholder and street mains, where the temperature cannot be controlled? It would be again condensed into oil. So that practically not more than the two-fifths of such oil can be converted into permanent gas and stored in the gasholder.

But it is not only in its passage through the apparatus, and in its quiescent state in the gasholder that it suffers loss; it is when passing through miles of mains to the consumer's burner, with all the consequent friction and changing temperature, that it also suffers deterioration both in illuminating power and in volume, as the samples in my possession, taken from the syphons and water-traps of the street-mains at different distances from the works, abundantly testify.

Experience has led me to adopt a chemical test for determining the quality of oil found best suited for gas-making, and which has the most permanent properties, but still is not all that can be desired; for when the temperature of the atmosphere falls below 60° Fahr., there is a deposition in the street-mains. And for the benefit of those who wish to try gas from oil, my specification for some time has been as follows:—

That the oil shall have a setting point of 65° Fahr.; a specific gravity of 930; the explosive point, or point of ignition, not to be under 120° Fahr.; the amount of impurities not to exceed 20 per cent.; when treated with 2½ per cent. of sulphuric acid, 1·845, and 3 per cent. of caustic soda. The amount of spirit to be not more than 5 per cent. at 212° Fahr., nor exceed 7½ per cent. at 248° Fahr. The boiling point not to exceed 400 Fahr.; to be neutral to litmus and turmeric paper, and free from water.

These last three years I have used such an oil in combination with coal, and believe it to be the best method of using it, because when thoroughly amalgamated with the coal, and both presented at the same moment to the same heat, the rich gases from the oil join on the instant with the poorer gases from the coal, and travel together through the apparatus to the consumer; and it has the great desideratum of producing a good coke because of the impurities of the oil, which are not convertible into gas, binding the particles of coal together to form a solid coke.

Apologizing for trespassing so much on your valuable space, my only excuse must be an endeavour to point out what I have found to be the most suitable oil for gas making, and as gas managers are in *great* want, in these times of dear and scarce coals and cannel, I trust that others may take the matter up, and, if possible, as Dr. Macadam said a year ago, "show how it is to be made permanent," and try to get 25-candle gas for 1s. 4d. per 1000 cubic feet.

Gas-Works, Dublin, Sept. 17, 1872. John Somerville.

Death of Mr. T. G. Barlow.—The following kindly notice of this sad event appears in the last number of *Le Gaz*, from the pen of its editor, M. Emile Durand:—"At the moment of going to press we hear of the death of our venerated *confrère*, Mr. T. G. Barlow. Time fails us to enumerate the services our *confrère* has rendered to our industry, and the claims he has established to the gratitude of all by the energy with which he has always defended its rights and interests. Having entered the arena long after him, we have always endeavoured to follow his example and in his track, and it is with sincere regret that we to-day hear of his death." The directors of the Tunbridge Wells Gas Company, at their last meeting, adopted the following resolution:—"The directors of the Tunbridge Wells Gas Company have learnt with very great regret of the decease of Mr. Thomas Greaves Barlow, who for upwards of 16 years was connected with the company as consulting engineer. The directors desire to avail themselves of their first meeting to express their deep sympathy with Mrs. Barlow in her sudden bereavement, by the the death of one whom they held in very high regard, and to place on record their due appreciation of his valuable services in the interest of the company."

Miscellaneous News.

BIRMINGHAM GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary Meeting of Shareholders was held on Thursday last, Sept. 19—Mr. J. T. COLLINS in the chair.

The following report and statements of accounts were submitted:—

The sale of gas shows a decided increase in quantity over the corresponding period of last year, but the reduction in price, made July 1, 1871, renders the receipts somewhat less. The returns from coke and breeze are much larger, owing to advances in price.

The allowance for bad debts is again larger, but it is believed that all the irrecoverable assets existing at Midsummer, 1871, have now been written off, or are amply provided for, and that the deductions under this head will henceforth be smaller. The professional charges are undoubtedly heavy, from the many exceptional matters dealt with during the past twelve months.

Your directors find that important changes are necessary in the works and mains. These will be made as quickly as practicable. Two additional scrubbers of large dimensions are now in course of erection, and other improvements are under consideration.

In view of the greatly increased cost of coal, labour, and materials, your directors do not recommend a larger dividend than that declared at the last half-yearly meeting—namely, 5 per cent. per annum on all classes of shares—which will take from the available balance of £11,874 13s., £7500, leaving £4374 13s. to be carried forward to next account.

The whole of the authorized share capital of the company has been called up, and only £15,900 of the loan capital remains to be borrowed. It will, therefore, become necessary to make early application to Parliament for further powers. This subject is now receiving the consideration of the board.

Your engineer, Mr. White, having resigned, the directors have appointed Mr. Charles Hunt, of the London Gaslight Company, to succeed him.

A resolution will be submitted to you at the general meeting on the 19th inst., empowering your directors to borrow the remaining amount of loan capital.

Balance-Sheet, June 30, 1872.

Dr.				*Cr.*			
To Shares raised under Birmingham Gas Act, 1855, 18 Vict., cap. 48—				By capital outlay—			
1200 class A., limited to 9 per cent., at £80			£96,000 0 0	Works	£172,519 8 4		
400 „ B., „ „ „ 8			3,200 0 0	Mains	97,670 4 7		
3750 „ N.O., „ 7½ „ 40			150,000 0 0	Meters, lamps, and collateral branches	52,510 0 6		
1370 „ N.O. (1866), limited to 7½ per cent. at £40	£50,800 0 0			Cost of Act of Parliament obtained in 1855	1,948 18 10		
Less unpaid	20 0 0					£324,649 12 3	
		50,780 0 0		Amount owing to the company for gas, coke, residuals, fittings, &c., exclusive of estimated bad debts, discounts, and commissions		42,263 1 6	
		£299,980 0 0		Cash on deposit at Birmingham Banking Company, Limited		15,000 0 0	
Premiums received on shares		3,716 0 0		Stock-in-trade—viz., coal, coke, residuals, and fitting materials		14,719 16 9	
Loans on the bonds of the company		74,100 0 0		Amount due for rents		183 1 6	
Unpaid dividends		67 9 0		Cash at bankers on general and on dividend and interest accounts, and cash in hand		7,903 9 4	
Trade debts owing by the company, and customers deposits		11,171 8 1					
Interest on loans unpaid		1,564 12 3					
Reserved fund		2,248 18 0					
Balance from divided account, amount undistributed half year ending December 31, 1871	£1,803 0 1						
Balance from profit and loss account half year ending June 30, 1872	10,068 12 11						
		11,874 13 0					
		£404,723 0 4				£404,723 0 4	

Profit and Loss Account, June 30, 1872.

INCOME.			EXPENDITURE.			
Sale of gas, after deducting discounts, adjustments, and bad debts, and expenses of public lamps		£36,158 4 11	Management—			
Coke and breeze, after deducting labour, expenses, discounts, and bad debts		13,209 18 1	Office salaries and collectors commissions	£1,933 11 11		
Tar, ammoniacal liquor, and sundries (less discounts), profit on fittings, &c.		5,563 11 9	Fees to directors and auditors	572 10 0		
Rents receivable		241 13 1	Stationery, bookbinding, printing, and incidental expenses	720 11 3		
					£3,281 13 2	
			Manufacture—			
			Coals, including tonnage and delivery	£30,556 2 2		
			Purifying materials and wages	695 15 3		
			Supervision, labour, retorts, tools, and implements, with ordinary repairs	8,838 9 6		
					40,088 6 11	
			Distribution—			
			Ordinary repairs, and maintenance of mains, with costs and repairs of services, and wages of meter inspectors		1,603 16 9	
			Meters—			
			Restoring and maintaining		217 15 11	
			Rents, rates and taxes—			
			Rents payable	£293 1 7		
			Rates and taxes	2,134 14 9		
					2,427 16 4	
			Professional charges		847 15 10	
			Interest on loan capital		1,565 4 3	
			Bank charges		77 10 9	
			Balance carried to balance-sheet		10,178 12 11	
		£60,178 12 10			£60,178 12 10	

The CHAIRMAN, in moving the adoption of the report, said the report and statements of accounts showed what was the position and prospects of the company. He might say, with regard to the directors who had had the control of affairs during the last six months, that they had had but one desire, and that had been to work the company in the best way, and to place it upon a secure and firm basis. They wanted to get it into a thoroughly good position, and to keep it there. There were a few points which were not mentioned in the report, and he would in a few remarks refer to them. There was one strong point to which he would allude in the first place. The accounts for the half year were now absolutely closed on the 30th of June; they did not run two or three weeks into the next quarter. The directors were thus enabled to draw up a definite balance-sheet, and they thus diminished the probability of error. Another point was this—that they had instructed their auditor, Mr. Beach, to maintain a continuous audit of the accounts. They thought this plan was likely to ensure safety. They had taken very great care in supervising all amounts placed to the capital account. With regard to every item they had been careful to ascertain whether it belonged to revenue or capital. They had a book which would show all the items, and what they were. The collection of debts was now under much better supervision than it was formerly. He might say that there was a regular supervision. They had a clerk whose especial duty it was to look after that department, and he was glad to say the amount of arrears was diminished. The amount written off as allowance for bad debts was in excess of the average of the last three years, though the average was a high one. Coals, of course, were somewhat more, and he supposed they might expect the price to increase; but they had entered into contracts for the winter and the spring, and they believed that the terms were favourable. The price of coke had also, as they were aware, considerably advanced, and this had led to an increase of their income. Notwithstanding the high price the sale kept up, they had entered into contracts at the advanced price. The residuals were also bringing them in a large amount. Having made some remarks respecting the new works for the purification of the gas, the chairman said the professional charges were heavy, but they hoped they would soon be reduced. There was no doubt, however, that before long they would have to go to Parliament. They wanted an extension of space for the economical working of the concern. With regard to this matter, however, the directors had nothing to bring before the shareholders at present. The subject was receiving their consideration, and probably they would call a special meeting to consider it. It would be seen that the debts owing by the company were very much less than they were formerly. The debts owing were only £10,000. Last Christmas they were £16,000, and in the previous half year £22,000. The better system of collection now adopted had given them the means of paying their debts more promptly. They had discontinued giving bills for coal. They had more than an equivalent; they had something in hand by the early collection.

Mr. BULLOCK seconded the adoption of the report. He said that since he had had the honour of sitting at the board he could bear his testimony to the earnest attention which every director had given to his duties. They had had a somewhat uphill task, but he believed they would succeed in putting the company upon a firm basis. He was afraid the debts would continue to be somewhat large. They had to give long credit to a large number of small customers, whose accounts were not worth collecting, though they did their best to get them in. These customers, however, changed and shifted about, and they lost their meters. He was referring to small houses, into which, after a small deposit had been paid, the company laid on the gas. The board were taking these cases into consideration. He should like to make a few remarks about the price of gas. He had made inquiries in other towns, and he did not find that in any large town the gas was so cheap as it was in Birmingham. At Bradford, Bristol, Liverpool, Leeds, Manchester, and Nottingham gas was much higher—in some cases 50 per cent. higher. In all cases it was considerably more. On an average, it was at least 25 per cent. higher. Now, if this company had 25 per cent. more upon their returns without increasing the cost of production, how much better would be their position? In many cases the companies in other towns charged for meters—sometimes as much as £2; this company did not charge anything. As regarded the price of coal, they knew that they were not in any better position in Birmingham than other companies were in other towns, as they had to get their coal from a long distance, the Staffordshire coal not being suitable for their purpose. He cordially endorsed every word which had fallen from the chairman. He was sure the directors had only one desire, and that was to make the company prosperous.

Mr. S. HARDING, referring to the proposed application to Parliament, said he should like the directors to consider the subject of the reserve-fund which used to belong to the company. A company in London, in connexion with which there were large defalcations, went to Parliament, and Parliament gave them the power to create a defalcation account. This enabled them to pay off the defalcations at the rate of £1000 a year, and thus they did not lose their reserve-fund. What was wanted was to have as large a capital granted as possible. The great effort of gas companies, when they went to Parliament, was to make their capital look as large as they could. He believed that was the case with a gas company not a hundred miles from there, and it had been found to be very beneficial in making up their funds. He thought they might get power to pay off so much per annum.

The CHAIRMAN said the directors were obliged to Mr. Harding for his suggestion. When they considered the matter they would bear in mind what he had said.

The resolution was carried.

The CHAIRMAN moved that a dividend of 5 per cent. per annum on all classes, free of income-tax, should be declared, and that warrants for the payment of the same should be issued on the 30th inst.

Alderman YATES seconded the resolution. He said the profit available for dividend was £10,068. At Christmas it was only £9306. This fact, he thought, went to show that there had been good management.

Mr. WILLIAMS asked what was the amount of profit this time last year?

Alderman YATES: In June, 1871, the amount available was £13,000.

Mr. WILLIAMS: And now it is only £10,068.

Alderman YATES: But we have only had a short trial of the new system.

Mr. WILLIAMS: I am not complaining. I only wanted a fair comparison.

Alderman YATES: The £13,000 includes £1500 brought forward from the previous half year.

Mr. BULLOCK: And we had to pay £15,000 debts.

The motion was then agreed to.

Mr. WATSON moved the following resolution:—"That the directors be and are hereby authorized to borrow, in the mode prescribed by the Birmingham Gas Act, 1855, the sum of £15,500, in addition to the sum of £74,100 already borrowed by the company under the said Act." They were not in immediate

want of the money, but the shareholders were asked to pass the resolution so that they might strictly observe the requirements of the Act. As would be seen, they had £7903 in cash, and they were in a position to put £15,000 on deposit. During the last six months they had not given a bill in payment.

Mr. KEMPSON seconded the motion, which was carried *nem. con.*

On the motion of Mr. J. S. C. WYNN, seconded by Mr. PICKARD, a vote of thanks was passed to the directors. Votes of thanks were also passed to the auditors (Messrs. J. S. C. Wynn and G. Beech) and the chairman, and the meeting ended.

NEWCASTLE AND GATESHEAD GAS COMPANY.

The Annual General Meeting of the Proprietors of this Company was held in the Offices, Neville Street, Newcastle, on Wednesday, Sept. 4. Alderman HEDLEY occupied the chair.

The SECRETARY (Mr. Wm. Hardie) read the report as follows:—

The directors beg to submit to the proprietors their report and statement of accounts for the year ending June 30, 1872. The total receipts on revenue account, including balance from last year, are £86,757 11s. 6d., and the expenditure is £61,935 0s. 8d., leaving a balance of £24,822 10s. 10d. In March last, intermediate dividends of 5 per cent. upon the A stock, 1¾ per cent. upon the B stock, and 3½ per cent. upon the C stock were paid. The directors recommend that similar dividends be declared now, and that they be payable on the 12th of September next. This will absorb £24,123 7s. 6d., leaving a balance of £699 3s. 4d. to be carried forward.

During the past year 18 miles of main-pipes have been laid in extensions and renewals, and 170 additional public lamps have been erected. The satisfactory state of the illuminating power and the purity of the gas referred to in last year's report have been fully maintained. The directors have received very complete plans and specifications for new works at Redheugh; but, owing to the high price of iron and other materials, they have deemed it prudent to defer further proceedings for the present. In the meantime 100 additional retorts are in course of erection at the Elswick Works to meet the requirements of the coming winter.

Owing to contracts for coal made in 1871, the directors are enabled to recommend the payment of the statutory dividends, but they regret to say that the prospects for next year are very unfavourable; the advance in the price of gas coal which has taken place is beyond all precedent. Coal is in fact more than three times what it was twelve months ago. The cost of all other materials used in the manufacture of gas and the rate of wages for labour have also largely increased. These circumstances were never contemplated when the Act of Parliament was framed limiting the maximum price of gas in Newcastle and Gateshead to the rates at present charged. It is the wish and intention of the directors to furnish a full and sufficient supply of gas, and they feel assured that the town councils of both boroughs, and the public generally, will assist them in procuring a short Act of Parliament to enable them to make a reasonable advance in its price, without which it will be impossible to carry on the works.

The directors—viz., Mr. William Brown, Mr. Thomas Hedley, Mr. Benjamin Plummer, Mr. James Douglas, Mr. John Bennett Alexander, Mr. Thomas Leslie Gregson, Dr. Humble, Mr. Ralph Atkinson, and Mr. William B. Wilkinson—retire from office, but offer themselves for re-election. The auditors, Mr. Robt. White and Mr. John H. Richardson, also retire, but offer themselves for re-election.

The CHAIRMAN, in moving the adoption of the report, said he must first express the great regret he felt at the resignation of Mr. Clayton, who, for so long a period, had presided over them with so much ability. It was a pleasure to know, however, that their old friend still took great interest in the welfare of the company, and that he might always be relied upon for advice in cases of emergency. For his own part, he was extremely sorry that on the first occasion he had to meet them as their chairman, he should be compelled to inform them that such an advance had occurred in the price of raw material for gas-making as could never possibly have been contemplated. Their company had usually made a practice of entering into contracts in the month of May, for a supply of coals to serve until the July of the following year. In May, 1871, they had contracts for any quantity of coal at very moderate prices, and it was this circumstance that now enabled the directors to recommend the payment of full dividends. It was quite true that they had had some little hesitation about doing so. They thought it would perhaps be well to keep something on hand as a reserve; but, after due consideration, they came to the conclusion that as the money was earned during the past year, it was only fair that the shareholders on the books should have the dividends which were fully due to them. The prospects before them for the ensuing year were exceedingly doubtful, and they were quite at a loss what to say on the subject. The enormous price of coal was decidedly against them; because not only was gas coal, during the present week, sold on Newcastle Quay at as much as 26s. per ton, but it was very scarce in the market as well. In May last, when they applied in the ordinary way for tenders, they communicated with a number of collieries with which they had been in the habit of transacting business, and also with many others that were likely to supply good gas coals; but, so scarce appeared to be the material, that they only received two offers, and these were at greatly enhanced prices. The full supplies offered to them were accepted, and they had been enabled to make other contracts since then. The whole of these, however, did not amount to the entire quantity required by the company, although they were sufficient to tide them over a good portion of the year. With these exertions, he might say, they would be able to go on without any loss to capital, but he feared that the dividend would be very small indeed at the end of the year. If the price of coal continued to advance as it was now doing, it was quite clear that the company must go to Parliament for a new Act by which the rates charged for gas could be increased also; and, if such a step were resolved upon, he might say that they did not expect it would be opposed by the Town Councils of Newcastle or Gateshead. In fact, he did not see how such a proposal could by any possibility be opposed. The average cost of coal during the year ending July 1, 1872, had been 6s. 7¼d.; in 1870, 6s. 0¼d.; in 1865, 6s. 5¼d.; and it had been pretty much the same during the whole of that time with one exception, in 1867, when it was 8s. a ton. The price now, as he had mentioned, was 26s. per ton for gas coal; and as 20s. was considered quite a moderate sum, it was exceedingly difficult to get an offer for any quantity even at that price. Some people might ask what was the cause of all this advance? and he was bound to admit that the question was a very difficult one to answer. His own opinion was simply this, that there had been an enormous increase in the demand, particularly for steam purposes, on account of the large number of new steamers that had lately been built; while every large manufactory, being fully employed, required an increase in coal. So also did the gas companies, and, indeed, as he had been assured by coal-owners, there was a very large and constantly increasing demand going on all over the country. Instead, however, of an extra quality of coal being wrought to meet this increase, the workmen had combined together to work less time, and had also insisted on having an advance of wages. Instead of the increased rate of pay having acted as an incentive for more diligent work, as it ought to have done, they had contented themselves with their old wages, and now only worked the reduced hours necessary to realize that amount. So great was the evil arising from this resolve, indeed, that in the county of Durham there had actually been less coal brought to bank than in the previous year; and in Northumberland the yield had only been about the same. It was a pity the men restricted themselves in this way, and did not try to benefit to the utmost extent by the unusual prosperity of their trade. The result was that now there were actually two buyers for every ton of coal brought to bank, and the keenness of the competition had run the prices up from the old average of 6s. 7¼d. to the startling sum of 26s. The Newcastle and Gateshead Gas Company had an annual consumption of 70,000 tons of coal, and that, at 20s. a ton, amounted to an expenditure of £70,000 for one article alone. It would be impossible, therefore, for the company to go on with their present prices for gas, except at a loss of all dividend, and a sacrifice of from £20,000 to £30,000 of capital. Well, then, how long was the present high price of coal likely to continue? His answer was that it would continue so long as the men prevented larger quantities of coal being brought to bank. In time, no doubt, the consumption would fall off—the steamboats not being able to make their profits—and then the price must come down quickly; but, in the meantime, what was their own company to do? The town could scarcely expect them to pay 20s. or 25s. per ton for coal, instead of 6s. or 7s. as in previous years, and yet continue to supply gas at the present low prices—averaging 2s. 9d., or 3s., over the whole quantity made. The real truth was that, under existing rates, the company would not be able to get as much gas out of one ton of coal as the coal itself cost. Nothing like it. Under these circumstances, the directors intended to apply to Parliament for power to take out the clause in their present Act which prevented them advancing the prices of gas, and to have another one substituted. He felt quite sure that the Town Councils of Newcastle and Gateshead would assist them in the present emergency. The directors carried on the works in the most economical way possible, and hence the public must have confidence in their still doing so. For his own part, he could not see how the contemplated application could be opposed. Every householder knew that he had to pay a largely increased price for coal, and the gas company had no option but to get the coal at the same market as the general public. Although gas was simply coal supplied in a different shape, there had in some places been a great deal of objection raised to a small advance; but he could assure them that in Newcastle there would have to be a considerable increase, as it could not be done without. Indeed, something like 40 per cent would be required, and even then they did not think there would be any dividend whatever if the present prices were maintained. They would have to do the best they could, of course, and impress upon the Town Councils the necessity of helping them; but, if this help was denied, he, for one, would not sit still and see the capital of the company wasted or thrown away. They would all have to sacrifice their dividend, but they ought not to be called on to sacrifice the capital of the company. He knew that many persons would tell them that 10 per cent. had been received by the shareholders for many years, and that they ought to be content. Such persons should remember, however, that one-third of their capital only bore interest at the rate of 7 per cent., and as nine out of every ten of the present proprietors had bought the stock they held at high premiums, the dividends amongst this class of holders were not more than 6 per cent. All those amounts would now be very considerably reduced, even if they got anything at all as a result of their business for the year. The report seemed to enter pretty largely into everything connected with the company's operations during the past year. He might just add that the quantity of coal then carbonized was 69,164 tons, as against 61,198 tons in 1870, being an increase in two years of 13 per cent. As compared with the 48,373 tons in 1865, however, the result of the past year showed an increase of 43 per cent. This was a very satisfactory progress to make in seven years, and hence, in consequence of such a great increase in trade, the directors, as stated in previous reports, had bought land at the Redheugh for the purpose of erecting thereon additional works to supply Gateshead. The gasholder had been finished for some time, and, as already indicated, very complete plans had been received for erecting works that could be gradually extended to meet the required demands of this town and Gateshead for a number of years to come; but still, owing to the high price of coal, iron, wages, and other things—all of which had operated against the gas company—they had deemed it prudent not to complete the undertaking at present. The company's working expenses had gone up from 8s. 1d. in 1865 to 11s. 3½d. in 1871, or an advance of 3s. on every ton of coal carbonized. The directors were very glad to report that the illuminating power of the gas had continued very satisfactory during the past year, being considerably over the 14 candles required by Act of Parliament; while the purity of the gas had been even better, only averaging 7 grains per 100 feet. They had scarcely any complaints at all, and he hoped they would be able to go in the same way. It was the wish of the directors to give a full supply of gas, and hence as the present difficulties had come unexpectedly upon them they hoped the town would give them additional support. In conclusion, he moved that the report of the directors be adopted.

Mr. R. WHITE seconded the motion.

The CHAIRMAN, at the suggestion of the Mayor of Newcastle, explained that the directors were doing all they could to keep up the position of the shareholders. They had increased the price of their coke from 6s. to 20s., and this, of course, would do something towards making up their expected deficiency.

Mr. FENWICK asked if the price paid for the lighting of the public lamps was fixed by Act of Parliament. If it was not, then he thought they might increase their charges in such an emergency as the present.

The CHAIRMAN: We cannot increase the rate, as it also is fixed by Act of Parliament.

Mr. FENWICK: Then supposing you cannot obtain powers from Parliament to increase your prices, are you, under such circumstances, compelled to provide the public with gas?

The CHAIRMAN: It is a very difficult question to answer. We ought to have had our late president to inform us on the point.

Mr. WILKINSON was of opinion that if the company went to Parliament they should endeavour to get such alterations as would in the future enable them to carry on their business, like other honest men, in accordance with the laws of supply and demand. All other companies round about them—in fact, throughout the entire kingdom—had risen their prices in accordance with the times; but here they had a company with a paid-up capital of nearly £300,000, yet that company could not take any steps for protecting themselves, although they saw before them a certain loss of dividend, if not also of capital, either of which results would be severely felt by some of the smaller shareholders of the company. With regard to the question asked by Mr. Fenwick concerning the public lights, he might say that he had himself invariably complained that those lights were not remunerative. He had heard that the corporation were not paying more than 1s. 6d. per 1000 cubic feet, and therefore, he thought, they might appeal to the council for some advance on that rate, for they, at all events, had the power of paying more if they chose. He thought they had a good case to lay before the council; but, at all events, if the directors saw their way to go to Parliament they should take care to secure power to conduct their business as other companies were doing, and receive a proper price for the article they supplied. He did not consider a gas company altogether an investment, except in the same way as money was applied to the purposes of manufacture. The making of gas was a business that was subject to contingencies, and not only should the capital have a dividend, but there should be something more to meet those contingencies. He was very glad that, notwithstanding the dark times on which they now appeared to have entered, the directors were determined to supply good gas, and to keep up the illuminating power. So far as he was concerned he should always like to see that done, and the gas supplied of as good a quality as skill could make it, and at the same time, at as cheap a rate as would allow a fair dividend, and a reasonable sum for contingencies. He did not think 10 per cent. was an unreasonable dividend for trade, but in their company the holders of at least £100,000, or one-third the entire capital, could not receive a sixpence more than 7 per cent. He happened to be one of the small shareholders himself, and they were the people who would feel the pinch most severely; and there were also widows and orphans to be considered. If they obtained an Act of Parliament, it would not get into operation for the next six months, and the shareholders must therefore depend on the wisdom and economy of the directors. The company would be consuming 300 tons of coal a day during the coming winter, or something like 2000 tons a week, and those 2000 tons meant, of course, at present prices, £2000 in money. It was quite

clear, therefore, under the circumstances, that they would not have any chance of getting a dividend at all for some time to come; but as he had always held the opinion that the company was well managed, they must still trust to the directors.

The CHAIRMAN, in reply, stated that the sum actually received for the public lamps was 2s.; but out of that the company had to pay for lighting, cleaning, and keeping them in repair, so that Mr. Wilkinson was not very far wrong when he said that 1s. 6d. per 1000 feet was all they got for it. The directors had thought of asking the corporation to pay an advance for the public lights—at a time when coals were about 15s. per ton—in order to make any alteration of the Act of Parliament unnecessary. Since then, however, he had had some conversation with the town clerk on the subject, and that gentleman had assured him, as the corporation had no funds out of which the advance could be met, that there was not the slightest hope of any change being allowed. The directors were very sorry for the small shareholders, and they would do all they could to get a small dividend for them; but still the company had no power to charge a higher rate except the Act was altered for that purpose.

Mr. J. B. ALEXANDER hoped the shareholders would not go away with an impression that the directors took such a very desponding view of the matter. The chairman, in his remarks, had spoken of the possibility of their having some day to pay 26s. per ton, and it was only in view of that contingency that he had taken such a gloomy view of their prospects. Now this advance could not occur during the current year, for the company had already secured a very large proportion of their required quantity of coals at a cheaper rate. Then, again, if they went to Parliament to apply for increased powers, he thought there could not be the slightest doubt but that, under circumstances like the present, they would either obtain permission to charge a higher price, or, at any rate, that some general power would be given, subject to the control of the Board of Trade, to vary the charges from time to time, as circumstances required. Then, again, supposing that during the present year their dividend should fall short, they should remember that the gas company's general Act empowered them to make up, out of the profits of future years, the deficiencies that might arise during any one year. They need not at all despair concerning the value of their property, as it would always remain good. It might be depreciated for a short time; but they need not be alarmed at that, as he felt sure that they were connected with a concern which, if it went under water for a little while, was sure to rise again, not being much worse for the check. With regard to the prices that the company received from the corporation, it should be remembered that it was only very recently that they had had an Act of Parliament of any kind; and that up to that time the corporation were the parties who permitted the gas company to open up the streets—to carry on their work, in fact—and hence, in consideration for the permission which the corporation granted in that way, he thought they really had some claim on the indulgence of the company. If, however, they went to Parliament for extended powers, they would charge not only the general consumer, but also the corporation.

The report was unanimously adopted.

The dividends as recommended by the board were then declared; and, after the retiring directors and auditors had been re-elected, the meeting terminated.

SOUTH SHIELDS GAS COMPANY.

The Half-Yearly Meeting of this Company was held on the 30th ult.—Mr. R. WALLIS in the chair.

The following report was presented:—

In consequence of the great rise in the price of coals, labour, and all materials used in gas making, and a large outlay for retorts, together with the reduction in the price of gas, which took place before the rise of coals, &c., your directors regret to say that the profits for the last half year have not been satisfactory. The gross receipts for the half year have been £10,718 13s. 11d., and the expenditure £8846 10s. 8d., leaving £1872 3s. 3d. as net profits.

Your directors propose to pay 4½ per cent. on the old and 3½ per cent. on the new capital of the company, which will require about £250 from the reserve-fund to make up the amount.

Your directors have the satisfaction to state that, for the last six months, the report of the inspector (Mr. Pattinson) appointed by the corporation, is most favourable, the average illuminating power having been close upon fifteen candles. The dividend warrants will be payable as usual on the 7th of September.

The CHAIRMAN, in moving the adoption of the report, said he was sorry to say that the company was not in so prosperous a condition this half year as it had been in many half years past. As they were aware, a great deal of change had taken place in many circumstances since last meeting. Wages had increased at least 20 per cent., and coals had risen very much in price; indeed, so had everything else connected with gas making, including the iron implements which were required. It was true that up to June they had had their contracts for coals, but notwithstanding this he must state that at times they had almost been in the dark—if he might use the term—for want of coals. It had been found necessary to supplement the contracts by purchasing other coals at a higher price with which to keep the works going, and the coals which had been bought in this way had been found "duffy" and bad. Still, however, the directors saw their way clear to recommending the same dividend as before. He could also state that there had been a large acquisition of capital in the Bolton and Harton Colliery district, and likewise in the district of Hebburn, which districts the company had taken upon itself to supply. During the last half year a very friendly arrangement had been effected with the Newcastle Company. That company had come to the South Shields side of a certain boundary line, but on this being represented to them, they had very honourably and very straightforwardly at once sold to the South Shields Company those pipes and other works laid in the territory of the last-named company. This amicable arrangement would in due time prove a source of profit to the South Shields Company. All these circumstances together, however, had rendered the revenue account less than had been anticipated. He had great pleasure in proposing "That the report and accounts as submitted to the shareholders be received and adopted."

Mr. HEWISON seconded the motion.

Mr. DOUGLAS inquired whether any provision was being made for Jarrow by way of extensions and new works.

The CHAIRMAN replied that this matter had occupied the attention of the directors during the whole half year, but they had not yet come to any determination. Two sites were in contemplation—one at Hebburn and one at South Shields; but he was afraid that before new premises could be erected at the latter place, parliamentary powers would have to be obtained. The matter was engaging the attention of the directors.

The report was then adopted.

Mr. W. ANDERSON, alluding to the price of coals, mentioned what had formerly been obtained for 5s. 3d. and 6s. had been contracted for at 13s.; and even at this price the company had been rather fortunate, for what had some time ago cost 13s. now sold at 20s., if not 23s. This to gas companies was a matter for very serious consideration, and if the high prices continued they would have to go to Parliament to obtain powers to charge increased rates, as companies could not possibly exist on the present charges. As far as present appearances went, things did not seem too prosperous. They were about to declare a dividend which had been earned in more prosperous times, but he thought they were justified in doing this as they had very wisely laid by a reserve-fund. He therefore moved that a dividend of 4½ per cent. for the half year be paid on the 7th of September on the old capital, and 3½ per cent. on the new.

Dr. ARMSTRONG seconded the motion, and reminded the meeting that on a previous occasion prices, for the benefit of the public, had been reduced 3d. per 1000 cubic feet, and this was one cause of the present deficiency. They would now have to return to the old prices, and even these would not recoup them for the extraordinary expenditure which was now coming against gas companies.

The motion, on being put, was carried.

Mr. DOUGLAS moved—"That the thanks of the shareholders be given to the directors for their continued care and attention to the interests of the company." He congratulated the directors on the efficiency of the company's works, and, alluding to the manner in which they had been taken by surprise by the sudden rise in the price of coals, remarked that things could not be expected to go on at the present feverish rate; before long he had no doubt there would be a change.

Mr. CUMMINGS seconded the motion, which was carried.

The CHAIRMAN, in returning thanks on behalf of the directors, said the last half year had been one of great anxiety and care. The works at Jarrow had engaged attention, but, if the present condition of things continued, the directors would be unable to come to a determination, and would have to carry on the present works a little longer. The coal supply and other matters had also been sources of grave consideration, but it was satisfactory to know that, despite all difficulties, the company had always been enabled not only to keep the gas up to the maximum illuminating power, but to keep one candle above it. As to the reduction mentioned by Dr. Armstrong, that alone would make a difference of £500. The chairman concluded by again thanking the shareholders.

On the motion of Mr. ANDERSON, a vote of thanks was accorded the chairman, and the proceedings then terminated.

BRIGHTON GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of the Proprietors of this Company was held on Thursday, the 29th ult., at the Offices, 13, St. Swithin's Lane, London—HENRY WHEELER, Esq., in the chair.

The following report and accounts for the half year ending the 24th of June, 1872, were submitted to the shareholders:—

The sale of gas during the past six months shows a fair increase on that of the corresponding period of last year. The directors regret to say that the difficulty of getting coal-ships loaded, alluded to the previous report, has continued. An ample supply of gas of good quality has, nevertheless, been maintained.

The directors recommend the declaration of a dividend on the paid-up capital of the company of 5 per cent. for the half year ending 24th of June last, less income-tax, the same to be payable on and after the 9th of September next.

It will be gratifying to the shareholders to learn that the directors have succeeded in purchasing the freehold in fee simple of that portion of the company's premises which was leasehold. It would occupy too much space to fully explain the advantages of this acquisition, and its importance to the permanent interests of the company. It may suffice to mention that for many years past the more costly extensions of the manufacturing and storeage apparatus have, of necessity, been made on that part of the property. As nearly one-third of the term in the lease had elapsed by effluxion of time, it has been considered only right to charge a part of the cost to depreciation account.

Dr. Profit and Loss Account, for the Half Year ending June 24, 1872. Cr.

To Coals	£8,601	4	7	By Gas and meter rental	£14,665	11	11
Materials for purification	289	2	0	Coke, &c.	3,048	11	7
Wages	1,501	1	6	Old stores, &c.	132	0	0
Rent, rates, and taxes	326	15	0				
Salaries, collectors commission, directors, and auditors	1,333	7	1				
General charges	170	5	8				
Wear and tear	1,246	9	11				
Bad and doubtful debts and allowances	212	8	5				
Interest on debentures	300	0	0				
Balance	3,865	9	4				
	£17,846	3	6		£17,846	3	6

Dr. Balance-Sheet, June 24, 1872. Cr.

To Capital	£80,800	0	0	By Expended on works	£83,014	12	0
Received on account of call made	2,150	0	0	Freehold of land—Purchased	2,500	0	0
Debentures	12,000	0	0	Less depreciation account	700	0	0
Contingency-fund	4,870	12	6	Works in progress	299	6	10
Depreciation account	1,382	19	11	Meters	2,193	19	5
Coal insurance account	1,072	10	3	Coal, coke, &c., in stock	4,236	18	5
Dividends unpaid	1,121	7	11	Mains, service-pipes, and general stores in stock	1,209	6	7
Interest on debentures	161	4	2	Sundry debtors for gas	6,533	7	7
Tradesmen's accounts, &c., owing	1,662	9	11	Sundry debtors for coke, &c.	1,319	15	2
Balance from last half year £398 8 4				Cash at bankers, and in hand	8,877	16	4
Balance this half year, as above £3,865 9 4	4,263	17	8				
	£109,485	2	4		£109,485	2	4

The report was adopted and the dividend recommended therein declared. The usual votes of thanks were passed.

SUNDERLAND GAS COMPANY.

The Annual Meeting of the Shareholders of this Company was held in the Board Room of the Offices, in Fawcett Street, Sunderland, on Wednesday, Sept. 4—Mr. E. C. ROBSON presiding.

The following report was presented:—

The company having been protected by contracts up to the 30th of June, the rise in the price of coals has not had much effect on the company's finances during the past year; but the increased cost of labour and materials has more than counterbalanced the increased revenue from gas and coke. An interim dividend of 5 per cent. on the original stock, and of 4½ per cent. on the original capital, was paid in March last; and your directors now recommend the declaration of a further dividend of 5 per cent. on the original stock, and of 4½ per cent. on the additional capital stock of the company, payable on the 14th day of September next. During the past year your directors have laid several miles of mains, and have nearly completed the additional works at Hendon, consisting of tar-tanks, and powerful set of condensers and scrubbers, and new purifying-house containing eight large purifiers—all, fortunately, contracted for previous to the advance in price. To defray the cost of these important extensions, your directors find it necessary to submit for sale by auction, at the close of the annual meeting, 1000 shares at £5 each, being part of the additional capital authorized to be issued under the Sunderland Gas Act, 1857. The directors of this company, in common with all other gas companies whose contracts have recently expired, have not only had considerable difficulty in effecting new contracts, but have had to pay enormously increased prices; your directors, whose desire it has been from time to time (whenever circumstances permit it) to reduce the price of gas, have now been reluctantly compelled to increase the rate of payment, in order that the shareholders may be, to some extent reimbursed for the extraordinary expenditure for coal, all other materials, and labour. The retiring directors are Messrs. Thomas Hewitt, Arthur Thistlewaite, Robert Vint, and Anthony Moore, who being all eligible for re-election, offer themselves accordingly.

The CHAIRMAN moved the adoption of the report, and in doing so said the past year was the first whole year during which the public had enjoyed the last reduction in the price of gas; but, notwithstanding that, they were able to show an increase to the extent of £4838 in their receipts. The total reached the sum of £40,135, the largest they had seen in any one year since the formation of the company, and an amount three times greater than that which the public paid for gas in the year before the amalgamation of the two companies—now about 18 years ago. This showed that gas was duly appreciated by the public, and he believed it to be best and cheapest both for warming and lighting. Were Mr. Hawksley present—who was perfectly *au fait* in all that related to gas and

its manufacture—he would tell them that what they had seen in the past with regard to its consumption was trifling in comparison with what they would see hereafter in the general use of gas. Whether that belief would be disturbed by the altered condition of the coal market remained to be seen. The increase of wages during the year amounted to a very large sum. He would not speak of this in any words of regret, because anything that gave the working man a chance to raise himself and save was always gratifying to employers. If the men did not avail themselves of these opportunities, the fault rested with themselves. He hoped the whole of the increase did not go in present dissipation, though he feared a large sum of it went that way. One most gratifying thing was the smallness of their law bill, which only amounted to £9 11s. They had nearly completed new works at Hendon, payment for which would be made by the sale of shares that day. These works were put up rather in anticipation of their demands than otherwise, but their present value would be to ensure the public an improved quality. The plant was on the best possible system, and contracted for at a most favourable time, by which he feared their contractors would be the heaviest losers. They had been delayed on account of strikes and non-delivery of iron, but would be in full operation in time to meet their wants. There was, of course, a large increase in the amount paid for coals, and as the contracts they had made for the coming year represented an increase to the extent of 100 per cent. in excess, they would have next year a considerable increase in the item "Cost of coals." Last year their coals cost 7s. 1d.; this year the average was 14s. 3d. That did not represent the actual advance in the price of coal, which was broadly stated in the public prints to be three times what it was a year ago. The most striking fact was the rise of coal over a period of 20 years. When that company was first formed they contracted for a three years supply of coals for engines at the low price of 8½d. per ton, whereas similar coals were now worth at the pit mouth 10s. at least, and he supposed a contract at 8s. would be asked for in vain. Gas was then 7s. 6d. per 1000 feet, but they had seen it range from 2s. 6d. to 4s., the latter being their parliamentary maximum. They had lately signified their intention of raising their price to consumers to 4s., with certain discounts, which would make it 3s. 9d. net to large consumers. The extraordinary rise in the price of coal showed the futility of making a parliamentary maximum in the price of gas. Their maximum was 4s., but they had not charged it, because they had not wanted it; whereas in a neighbouring borough the maximum was 3s. 4d The price of gas thus fixed by a Parliament which could not fix the price of coal was so great an absurdity that he wondered it should be listened to in this enlightened age. If interference was necessary, it should be in delegating to the Board of Trade power to revise from time to time the price of gas, so as to make it bear some proportion to the cost of coal. It was to be hoped the high price of coal would lead to greater economy in its use. Gas might be largely used for domestic purposes, such as cooking and warming houses; but Englishmen had a prejudice in favour of blazing fires, and would not hear of warming their houses by hot pipes. Another difficulty was the change needed in the arrangements and the ranges of a house. In these respects, however, a change would come in time. But if they had to pay a high price for coal, they would be able to get a high price for the coke they produced; and, if it did come to that, they had a little thrift-box of £3000 to draw upon, if needed, to help the dividend in any bad half year. There was one important point, that they could defy competition, because their capital was so low in comparison, for the plant and works, which had cost them £125,000, could not be laid down now by any one else under £250,000. Large pipes, which they bought at £4 a ton, could not be had now under £9 or £10, and labour was equally dear. He congratulated them on having a remunerative business, a capital plant, and a town in which commercial skill and pluck were proverbial.

Mr. JOHN M'GUIGGAN thought it was a very favourable report under the circumstances. The public could not object to their raising the price of gas, when they saw steamer companies were paying from 25 to 50 per cent. They did not get so much for their money as was supposed, because when they had to pay £8 10s. for their £5 shares, their 8½ sunk to 5½ per cent.

Mr. JAMES RICHARDSON said the last shares he bought were £9 17s. 6d. each, and he was satisfied that the majority of shares in that company were held by gentlemen who received barely 5 per cent.

Alderman ALCOCK said that something should be put in the annual report to show the dividend they actually received, and to disabuse the public mind on this subject. Some people said they had no right to raise the price of gas while they received these so-called high dividends.

The SECRETARY (Mr. Cox) pointed out that, as shares became stock, it was impracticable to declare dividends in any other form than that in use now.

The CHAIRMAN said their stock was in the same position in the market as that of railway companies, and it was well understood by commercial men. It was not understood by inveterate grumblers and the inveterately ignorant who would not be taught. He expected great things from the School Board, and the happy day might arrive when they would get rid of this difficulty.

Mr. VINT thought they should keep on their premises, for the inspection of the public, specimens of stoves and other gas apparatus, so as to encourage the use of such things.

Alderman ALCOCK said that for some years he had a gas-stove in his kitchen, and believed it to be the cheapest mode of cooking. The difficulty was in getting servants to manage it. If they could supply cooks as well as gas-stoves the thing would be perfect.

Mr. W. DIXON said that nearly all the cooking in his house for the last 10 or 12 years had been done by means of a gas-stove, and in a most satisfactory manner.

Resolutions were then passed declaring a dividend of 5 per cent. on the original and 4½ on the additional stock of the company for the half year, and re-electing the retiring directors.

The proceedings closed with votes of thanks to the directors and the chairman, and the company then adjourned to the Queen's Hotel, where a sumptuous luncheon was served up in Mr. Shiel's best style. After the loyal toasts had been given from the chair, Mr. Bulman, auctioneer, put up for sale 1000 new £5 shares, which realized prices ranging from £8 5s. 6d. to £8 10s. 6d.

HASTINGS GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 3rd inst.—Mr. DEUDNEY in the chair.

The CLERK (Mr. W. B. Young), having read the notice of meeting, the following report was presented:—

The directors regret to state that the coal difficulty mentioned in their last report has since increased to a much greater degree, and they have raised the price of gas, from the 1st of July last, to 5s. per 1000 cubic feet.

The accounts, duly audited, leave a balance of £1723 5s. 7d. profit, which, with the balance of £176 2s. 9d. brought on from last half year, leaves £1899 8s. 4d. to be dealt with by the shareholders; and, after paying £200 off the suspense account, it is recommended that a dividend at the rate of 5 per cent. per annum be paid on the last issue of shares, and a dividend at the rate of 4½ per cent. per annum on the whole of the other shares, and that the balance of £21 5s. 10d. be carried on to the next half year.

The directors here beg to remark that the diminution of profit in the half year is wholly owing to the extra amount they have to pay for coals.

The following three directors retire by rotation, viz.:—Mr. George Scrivens, Mr. E. W. Stubbs, and Mr. James Rock; one auditor, Mr. F. Bennetts, also retires by rotation on this occasion; all four gentlemen are eligible, and offer themselves for re-election. There is a vacancy in the directorship occasioned by the death of Mr. W. Scrivens, which the shareholders are at liberty to fill up on the present occasion.

The capital account showed an additional expenditure, for lands and new mains, of £935 15s. 5d., leaving a balance of £4676 1s. 9d. in hand. The working account shows the profit balance named in the report, which is confirmed by the general balance-sheet, though there is a balance of £272 12s. 3d. due to the bank.

The CHAIRMAN, in submitting the report for approval, said he regretted the statement he had to make was not more favourable; but it arose entirely from the unexceptionally high price which coal had reached. With all their anxiety and labour, it had become absolutely necessary to raise the p rice, as stated in the report which each shareholder had received. He was sorry to see, from reports in the papers, and in other ways, that there was little hope of any great reduction in the price of coal. Had the directors kept the price of gas at 4s. per 1000 they would have been unable to pay a dividend at all. During the past half year they had paid no less than £1400 additional for coal on the quantity ordinarily used. Under other and more favourable circumstances that amount would have been available for dividend; and would have brought up the balance available for distribution to pretty nearly the amount which had heretofore been paid. He hoped events might arise so that, at no distant day, they might be able to reduce the price to the consumer. Some of those present knew that the board had been considering the expediency of giving up the fitting department, which had been established at a period when it was not easy to get good fittings, or to have work properly done. But that state of things having passed away, the directors had invited tenders for the sale of their stock. The chairman then referred to the substitution of a large second-hand meter at the works, in place of an old one which was not capable of passing so much gas as was consumed; and he explained that an arrangement had been made for the disposal of coal tar for the next three years. He expressed his hope that the receipts from coke would improve; and, in reference to the suspense account, reminded shareholders there had been a debt in existence which had been in course of gradual liquidation, and, with fair success, and no great advance in coal, might be paid off at no long interval. As to coal, all that the ingenuity of man could devise had been carried out to obtain a supply, and he was happy to say there was a good stock, though bought in at a high price. With the present arrangements of the board, he had reason to hope that during the winter they would be as well supplied—if not better—than most other works in the kingdom. The chairman here read a report from Darlington, to the effect that, in house coals, there was likely to be a larger supply, and no advance in price; but that no advantage would be likely to arise to purchasers of gas coal, which was quoted very high. He added that the matter had been one of no little anxiety and trouble to himself and the board, and that had it not been for the ability and tact of the clever manager of the works (Mr. A. H. Wood), he was perfectly sure they would not have come through so fairly as they had done. When he took the chair, 15 years ago, the company was in a difficulty similar to that now existing, and the dividend was reduced; but matters rallied, and they made up the difference as soon as possible. He quite hoped they might have the same success now. To show the difference in the 15 years, he would give a few figures. In coal, in 1857, they required 2827 tons for consumption; in 1862, 4951 tons; in 1867, 8800 tons; and in 1872, 11,380 tons. That showed the extent of growth of the town and the prosperity it had, as well as the possibility of requiring 22,000 tons in another 15 years. He believed the works would be equal to any demand which might be made upon them for some years, and that the only outlay on capital which might be expected would be the laying of mains in newly formed streets. In the quantity of gas consumed there were similarly astonishing figures. In 1857 the total sold was 24,988,000 cubic feet; in 1862, 38,596,000 cubic feet; in 1868, 71,205,000 cubic feet; and in 1872, 96,935,000 cubic feet. The number of customers had progressed from 898 to 1475, then 2437, and now 3200. In conclusion, the chairman moved the adoption of the report.

Mr. JOHN HOWELL seconded the motion. He considered 4½ per cent. was not a sufficient return on capital invested in business. The exceptional circumstances of the half year had justified the directors in departing from the understanding there had been as to raising the price of gas. He felt very pleased that there had not been a rise when first contemplated, because they had shown the public that shareholders also suffered in accepting 4½ per cent. instead of the ordinary dividend. But he did not think gas consumers would expect that the shareholders would be content with 4½ por cent., and he believed that the rise of gas to 5s. would not give a better dividend than had formerly been paid. If from any cause the price of coal should go back he hoped the charge for gas would also be reduced. He did not think the company should be in debt. It would be better directly there was a return of prosperity to take a little less dividend and pay off the debt. He thought 7 per cent. was a fair dividend, which they ought to expect to pay.

The CHAIRMAN having given some explanations as to some of Mr. Howell's statements,

The motion for the adoption of the report was put and carried.

The retiring directors and auditor were re-elected, and the vacancy caused on the board by the death of Mr. W. Scrivens was filled up by the appointment of Mr. Joseph Brown.

Mr. BROWN returned thanks. He took his election to be the greater honour, because it had been entirely unsolicited on his part. When first solicited he had some hesitation, because he thought some moral courage was required to enter a board when the dividend had fallen one-half, and half the prosperity of the company had gone at one swoop.

The CLERK: We do not think so.

Mr. BROWN: There is the fact that it is so, but I think it can only be temporary. The speaker said he also wanted to know how it was that the company had not paid the same dividend as other companies, which were not more favourably placed than Hastings. No gas company ought to pay less than 10 per cent. How was it, he asked, that with a large portion of capital only receiving 7 per cent., and debentures at 5 per cent., the original shares could not receive more than they did? No doubt it was greatly dependent upon the price of coal; but, on the other hand, a neighbouring company paid 10 per cent.——

The CLERK: Do you allude to Brighton?

Mr. BROWN said he did.

Mr. YOUNG: Then I will tell you: the Brighton Company has a large reserve-fund, out of which the dividend has been paid. They want to go to Parliament for fresh powers, but they cannot do so till they have got rid of the reserve-fund.

Mr. HOWELL: Folkestone pays 10 per cent.

Mr. BROWN saw the statement in the paper, and took it to be correct. It ought to have stated how the dividend was made up. The speaker concluded by a statement of his opinion that the first duty of the directors was to make a good dividend, and then to assist the consumer by giving him a good article at as low a price as possible.

Mr. HOWELL contended that, as the company had a monopoly of the essential article, light, the question ought not to be treated on the same footing as an ordinary trade transaction; and that a fair interest on the money was all that ought to be expected.

The CHAIRMAN remarked that a straggling town, with a great length of main, from which there were comparatively few private services, could never be worked so cheaply as a town of thickly-inhabited streets, where there were numerous consumers. If they waited a few years longer, until the open spaces were better filled, they might then hope for a 10 per cent. dividend, and yet be able to supply gas cheaper.

On the motion of Mr. C. AMOORE, seconded by Mr. JOSEPH AMOORE, the annual allowance of £200 to the directors (free of income-tax) was voted.

Mr. C. P. HUTCHINGS, in moving a vote of thanks to the chairman, said

he hoped Mr. Deudney might be spared for another 15 years to preside over them.

Mr. EDMED seconded the motion, which was carried.

The CHAIRMAN, in acknowledging, said the proprietors must not be angry if he candidly told them that he was anxious to retire into private life, rather than to enter further into business matters.

BRISTOL UNITED GASLIGHT COMPANY.

The Half-Yearly Meeting of this Company was held at their Offices, Canons Marsh, on Thursday, Sept. 19—Mr. WILLIAM NAISH (the chairman) presiding.

The SECRETARY (Mr. Townsend) read the report for the last six months, which, after adverting to the increased charges from the greatly advanced price of coal, labour, &c., stated that but for a balance in hand the company would not have had sufficient to pay the dividend of 10 per cent., the excess of outlay being 40 to 50 per cent. This excess compelled them to raise the price of gas to the public consumer 6d. per 1000 feet, from the 30th of the present month. The report stated that they had sold by auction one thousand £20 shares of the company since the last half-yearly meeting, which realized £37,140. This sale having exhausted the powers of the company to raise increased capital, they would have to apply in the next session of Parliament for further authority to raise additional money. The report concluded by recommending a dividend at the rate of 10 per cent. per annum, subject to income-tax, to be paid on or after Monday, the 30th of September.

The CHAIRMAN, on moving the adoption of the report, said that he addressed the proprietors with feelings of much anxiety—with feelings very different to those in which he had been accustomed to address them in past times, when the company had a career of such continued sunshine that the congratulations of the chairman assumed the character almost of monotony. Now it was different, though this anxiety was rather caused by the prospect of the future than by a contemplation of the past; for, notwithstanding the last reduction which they had made in the price of gas, their rental had righted itself. The change was caused by circumstances which they were unable to control or resist, and which had come upon them somewhat suddenly, though when he last addressed them he foreshadowed the difficulties which, like flying clouds, were then beginning to presage the approaching storm. The storm had now broken upon them, in the form first of the great difficulties they had experienced to get a supply of coal at any cost. How to get through the coming winter was a matter of great anxiety to them, with the article advanced from 50 to 100 per cent. However, he had said to those engaged in the practical carrying on of the concern that they must keep up a good supply, whatever else was done or whatever the expense might be. What the expense was likely to be the proprietors could themselves judge from a circular which he held in his hand, and which they received that morning from the Newcastle-upon-Tyne and Gateshead Gas Company, in which it was said that, until the recent and enormous rise took place gas coals could be purchased in Newcastle at prices ranging from 5s. 6d. to 6s. 6d. per ton, and at present the price demanded was 25s. per ton, equal to a rise of 300 per cent. When the rates they had to pay for the raw material were so high, with the advance in wages, and the extravagant rating of their mains and pipes, they could not, without help from their funds in hand, hope to keep up the dividend they had been paying for some time. They were, accordingly, necessitated to advance the price of gas, as persons could not expect to have that, any more than anything else, on the same terms as before, when the cost of production was considerably less. He (the chairman) hoped, as the price of coal was artificially raised by a combination between masters and men, that the rise would be but temporary, and the consumers might depend upon it that when the cost of production was diminished, the charge to the public would be lowered without delay. The chairman also alluded to a society called the Amalgamated Association of Miners, by which combination the present enormous rates for coal to the public were maintained. He was happy, however, in being able to say there was an agreeable element in what he had to communicate to the shareholders, namely, the splendid condition of their works, which were second to none in the kingdom. All they wanted was more room for gasholders, which they would soon obtain, and by which they would be able to make effectual use of the large manufacturing power they possessed there in Canons Marsh, and at the St. Phillip's works. He concluded by moving the adoption of the report.

Mr. F. TERRELL (vice-chairman) seconded the motion.

Mr. T. GIBSON said that before the motion was put to the meeting he would call the attention of the chairman to what he thought had once or twice previously been brought before the proprietors—namely, the desirability of publishing the accounts, that they might have an opportunity of considering them before they assembled in that room. Hitherto, when they had been paying 10 per cent., and everything had been moving smoothly, perhaps it had not been a matter of so much importance; but now, with difficult times a-head of them, as the chairman had told them, it would be satisfactory if they were enabled to examine those accounts leisurely and more closely than they were able to do by the secretary reading a mass of figures, one-third of which they could not retain in their minds. In making these remarks he did not mean for one moment to reflect upon the management of the directors, or their capability well and judiciously to conduct the affairs of the company; he only threw out the hint for the board, with whom he left the option of acting upon it or otherwise.

The CHAIRMAN said there was no reason for wishing to conceal anything in connection with the accounts, but he considered, that being a private company, in which every proprietor had an opportunity of looking at the books and making any inquiries and examination he pleased, it would conduce to no good purpose to place before the general public all the particulars of the manner in which they carried on their business. Formerly, when the same suggestion was made at those meetings, the directors—and their then chairman in particular, the late Mr. George Thomas—considered that it would not be judicious to publish the accounts which had not hitherto been published.

Mr. LYDDON, another proprietor, said he fell in with the remarks made by Mr. Gibson, and he thought it would be well if the accounts were published. There was another point upon which he desired to say something, and that was with reference to the increased charge for gas, which gave much discontent out of doors. He thought an advance of 3d. per 1000 feet would at first have been sufficient. In the neighbouring city of Bath, and in some other places, they had not made any advance, though, of course, he could not say whether the desirability of doing so might not suggest itself to those companies. He was of opinion that so long as the reserve-fund (about £25,000) was not seriously encroached upon they ought to stave off as far as possible an advance of price. He also referred to the mode of lighting the public lamps, and said they ought to be lit by the pole, which was the plan adopted generally on the Continent and in the neighbouring city of Bath. That mode of lighting would save nearly half an hour of the time of lighting and putting out the lamps. He would like to have some information, too, as to the way in which they proposed to expend the amount raised by the last sale of gass shares, and for what purpose they would require to go to Parliament for new powers to add to their capital. Some allusion had been made to the extension of mains, pipes, &c., but extensions were not always profitable, and he suggested that where a fair remuneration could not be looked for extensions should not be carried out.

The SECRETARY (Mr. Townsend), in replying to the latter questions, said that the company doubled their sale of gas in about every seven years, and their capital for so large a concern being only very limited they would largely require for present uses—for extension of works and mains—what they obtained by the recent sales; while to provide for future contingencies was their object in going to Parliament for fresh powers. With regard to the extension of mains, the company were bound to supply all who asked them for gas, and if they refused the application of the consumers they would lay themselves open to censure, and justify some of the present groundless complaints that were made against them as a monopoly. For if they would not meet the demands of the public, others, of course, would be found to do so.

The CHAIRMAN also said they were bound to supply consumers, and to offer facilities to the fullest extent in their power for supplying the citizens with light. If they did not do so, they could not complain if others came forward and offered to meet the demand.

Mr. LYDDON expressed himself perfectly satisfied with the explanations that had been made.

Mr. JOSE said, with reference to the lighting of the lamps by poles, the directors had it in consideration, and whenever they thought they could do so with advantage and facility they would be sure to adopt that plan.

The proposition was put and carried.

The CHAIRMAN then moved, "That a dividend at the rate of 10 per cent. per annum, after payment of income-tax, be made on and after the 30th of September."

Mr. GIBSON seconded the motion, which was put and carried unanimously.

The retiring directors, Messrs. Jose, Colthurst, Spark, and Wills, were then re-elected unanimously.

Mr. JOSE returned thanks for himself and brother directors who had just been re-elected, and said he had been nearly 40 years a member of that board. When he first joined the company the price of gas was five times as much as it now was—namely, 15s. a 1000 feet. His re-election extended for three years more, and at the expiration of that time, as he would then have passed three score years and ten, he would retire, as he considered that when a man got to a certain time he could hardly expect to discharge the duties of an office as effectually as before, and it was incumbent on him to make room for others. He would not now leave the board because they might be said to be in difficult times, and he would like to see them through the shoals and dangers of the next year or two.

Mr. Wilberforce Jose was re-elected auditor of the company.

Mr. LYDDON remarked that he hoped in going again to Parliament they would see whether they could not divide the new shares *pro rata* among the present proprietors.

The CHAIRMAN replied that Parliament was too jealous and too vigilant; they could not expect them to consent to such an arrangement. As it now stood, the public had the full benefit of any premiums paid for the shares that been sold by auction.

Mr. FIDDES, the engineer to the company, wished to explain, with reference to the lighting of the public lamps by poles, that the plan was tried for the first time in Bristol 18 years ago, but they were obliged to give it up owing to the large deposition of naphtha in the pipes. They hoped, however, to remove the latter evil, and, whenever they could see their way clear, to adopt the plan referred to by Mr. Lyddon.

Votes of thanks to the chairman and officers, on the motion of Mr. LYDDON, seconded by Mr. GIBSON, concluded the business of the meeting.

HARTLEPOOL GAS AND WATER COMPANY.

The Annual Meeting of Shareholders was held on Friday, the 30th ult.—Mr. JOHN GREY, deputy-chairman, presiding.

The following report of the directors was presented:—

In presenting the annual statement of accounts for the year ending the 30th of June last, your directors have the gratification of being able to report that the company continues its course of prosperity.

The divisible balance is £10,033 19s. 11d., out of which the directors recommend the payment of a dividend for the last half year at the rate of 10 per cent. per annum on the old, or A shares; at the rate of 7½ per cent. per annum on the B shares; and at the rate of 7 per cent per annum on the remaining paid-up capital of the company C, in all cases *less* income-tax.

The great increase in the price of coals, labour, and materials of every description, may necessitate an increase in the price of gas during the ensuing year, and a revision of the water-rates.

It will be seen, on reference to the subjoined report of the engineers that, during the last three years, the water consumption for business purposes has been doubled, which necessitates the providing additional storeage for soft water, and the raising of the embankment to the height authorized by the company's Act of 1867; and with this view, your directors are negotiating for the purchase of additional land at Hurworth Burn, which they hope to obtain at reasonable price; should, however, these negotiations for private treaty not result in a purchase of such land, compulsory powers must be obtained by your directors, as the company's powers to raise the embankment, as above indicated, expire in May, 1874.

The following is a copy of Messrs. Martin and Fenwick's report on your works:—

"*Leeds, August* 9, 1872.

"*To the Directors of the Hartlepool Gas and Water Company.*

"Gentlemen,—We have the pleasure of reporting that, since the Hurworth Extension Reservoir and Conduit, the works have continued to act satisfactorily, and a constant supply of soft water has been maintained in the Harte reservoirs, sufficient to meet the greatly increased consumption of the past year.

"When the Act was obtained in 1867, authorizing the extension to Hurworth Burn, the total annual consumption of water for manufacturing purposes was only 66 million gallons, whilst at the present time a supply at the rate of 217 millions of gallons per annum is poured into the Harte reservoirs, to meet the necessities of the manufacturers of your district.

"The demand for soft water is moreover steadily increasing, and the rapid extension of iron works and other manufactories at the Hartlepools, indicate the necessity of being still further prepared to utilize by storeage the abundant yield from the company's present sources of supply. The existing storeage is sufficient for present wants in ordinary seasons; but for such a storeage as would be required to meet an increasing consumption, and the contingency of a dry summer, more reservoir space will shortly become necessary. The actual construction of additional works will probably not be required for some time, but it is essentially necessary that the company should be empowered to acquire land for the purposes of extension, in anticipation of the probable increased demand, and the above contingency. By the acquisition of 20 acres of land at Hurworth Burn, the reservoir there may be considerably enlarged at a small cost.

"The new water-tower at the pumping-station is making satisfactory progress. The large iron cistern to be placed upon it will be nearly three times the size of the present one, and will enable the company to supply the most elevated parts of the towns and suburban districts from these springs.

(Signed) "MARTIN AND FENWICK."

The accounts appended to the report show that the gas and water rental for the year amounted to £14,098; residuals, £1672; and rents, £120. The gross profit on the gas revenue account was £7950. The receipts for water sold, rent of fittings and meters amounted to £7609, and the gross profit on water revenue account was £4690. For gas and water fittings a further sum of £113 was received. The balance of profit and loss account was £10,033.

The CHAIRMAN moved—"That the report of the directors, together with the balance-sheet, be taken as read; that, out of the divisible balance of £10,033 19s. 11d., a dividend be declared for the last half year, at the rate of 10 per cent. per annum on the old or A shares; at the rate of 7½ per cent. per annum on the B shares; and at the rate of 7 per cent. per annum on the remaining paid-up C capital of the company, in all cases less income-tax; and that the same be made payable on and after Monday, the 9th of September."

Mr. E. WADDINGHAM seconded the motion.

Mr. DOBING asked for some explanation respecting the proposed purchase of additional land at Hurworth Burn, for which the report stated the directors might have to seek compulsory powers. He thought the obtaining such powers was a matter deserving great consideration.

The CHAIRMAN said it was only in the event of private negotiations failing.

But the board did not fear that. They would not go to Parliament if they could avoid it. They were as anxious as Mr. Dobing to save money.

Mr. DOBING: You have invested a further sum of £20,000 on the Hurworth extension. What has that realized? You are paying for it at the rate of 7 per cent.; but I do not find that it has realized half that.

The CHAIRMAN: You would not stop our water supply?

Mr. DOBING: But what has it realized? Has it realized what the directors anticipated?

The CHAIRMAN: I do not know that it has; but it has realized more than you say. Only last week we got a new customer who will be worth from £30 to £40 per annum to us. If we had not been able to supply him, what would have been the consequence?

The SECRETARY: The £20,000 expended on the Hurworth extension in the supply of soft water has realized, in the gross, £3623.

Mr. FISHER: We have not hitherto been receiving the full benefit of the Hurworth Burn undertaking; but we shall, I hope, by the time it is properly developed. The manufacturers are increasing their demands almost daily, and there are others who will want water by next year who are not taking a single gallon at present.

Mr. FENWICK said they must agree with Mr. Dobing that to take a step like this was a matter that should have very great consideration. But, from what the shareholders had seen of the company's acts, they must have become convinced that they are not likely to do anything of this nature without proper consideration. He took exception to one remark of Mr. Dobing's, and that was that their first duty was to see that a dividend was forthcoming, and how much that dividend amounted to. The company enjoyed a monopoly of the district; and he contended that their first duty was to see that the district was properly and adequately supplied with both gas and water. He did not know whether they had seen the article that had appeared that morning in the *Northern Echo*, the concluding paragraph of which ran as follows:—"We venture to say that their monopoly of the sources of supply involves a duty, not only to existing manufacturing interests, but to a district whose future demands an extension of manufacturing facilities; and that that monopoly can only be continued with public advantage so long as the duty we have indicated is satisfactorily discharged." Could they say that their duty was "satisfactorily discharged" unless they endeavoured to meet the wants of the district? Hitherto the company had but barely kept ahead of the consumption. But he was happy to say that the company was in a far better position to-day as regards supply than ever it had been before. They had storeage enough to supply the manufacturers between 60 and 70 days. But, as they must be well aware, that amount of storeage was not enough to keep them well supplied, in the event of another drought such as that which occurred a year or two ago. And if ever they had, he feared they would only be too glad to fall back on their pumps for hard water, in which case the manufacturers would soon begin to complain. The company's duty was to march abreast of the times, and to be provided with such a supply as would keep the manufacturers quiet, instead of relapsing into the old position, when they had to serve them with hard water.

Mr. FISHER pointed out that the capital account last year was £153,249, and this year, £161,837. There was thus an increased expenditure of £3618. The revenue had increased to the extent of £2258, of which £1475 was for water alone.

Mr. THOMPSON said it must be clear that an additional supply of water was an absolute necessity. The gas had been paying better than the water. But it was well understood by every shareholder that the water supply must be kept up, and, with due regard to the dividends payable, at the cheapest possible rate.

The resolution for the adoption of the report was then put, and carried unanimously.

The retiring directors and auditors were re-elected, and the proceedings terminated with a vote of thanks to the chairman.

GLASGOW CORPORATION GAS-WORKS.

OFFICIAL INSPECTION OF THE WORKS.

On Friday, the 13th inst., the Gas Committee of the Corporation, with a number of the other members of the board, made an official inspection of the various works under their charge. The Tradeston works, which were first visited, were found to be in most efficient working order, and the various improvements which have recently been made on that establishment were examined with interest. At Dalmarnock, which came next in order, it was found that various important additions are being made to the works. Three large new condensers are being erected, and the purifying-house is also undergoing rearrangement. The changes in progress will give an addition of two sets of purifiers; each set containing four purifiers of 30 feet square. The operations are advancing rapidly, and, when completed, will tend still further to improve the quality of the gas supplied by the corporation, while the quantity produced will be increased to 5 millions of cubic feet per day. The principal interest, however, centred in the extensive works in course of construction at Maryhill. The Dawsholm Gas-Works, as the new establishment is to be called, are being erected on a triangular piece of ground which formed part of the estate of Sir Geo. Campbell of Garscube. The river Kelvin forms what may be described as the base of the triangle, and the Forth and Clyde Canal and the Stobcross branch of the North British Railway the two sides. The original purchase extended to about 22½ acres; but the committee have since acquired the whole of the ground up to the side of the canal, and a small level plot on the east side of the Kelvin, so that the property belonging to the corporation will not amount to less than 30 acres. The new establishment, when completed, will provide for the production of over 9 million cubic feet of gas per day, or about equal to the whole of the present supply. The works at present in progress, which are on a restricted scale, will give an additional supply of at least 3 millions of cubic feet per day. It was expected that this portion would have been ready for use by November; but the exceptional character of the weather, and the difficulty experienced in procuring labourers, has seriously retarded operations. The works are, however, sufficiently far advanced to give the visitor a general idea of their character and extent. The heavy portion of the operations in connection with the retort-house is well forward. This building, which occupies a site at the south side of the property, is of immense extent, measuring some 600 feet in length, by about 120 feet in width, and will afford accommodation for about 500 retorts. These occupy the centre of the building; and on either side coal-houses, each 60 feet in breadth, run along the whole extent. In the case of gas-works generally, the outlay for the cartage of coal is a very heavy item, amounting in Glasgow, we believe, to something like 5d. per ton; but the proximity of the Dawsholm works to the railway and canal will enable the commissioners to reduce this charge to a mere nominal sum. The site of the works, it should be explained, consists of a sort of natural amphitheatre, and the railway and canal, which form the boundary on two sides, run at a considerably higher level. Taking advantage of this circumstance, the engineer has been enabled to make arrangements for having two lines of rails from the Stobcross Railway and the Forth and Clyde Canal carried into the works, and by means of these the railway waggons will be run into the retort-house, and the coals, being tipped into the coal-stores, will be at once ready for use. The piers for these service railways, which stand each some 25 or 30 feet in height, have been already built for about two-thirds the length of the retort-house; and a bridge for carrying the line to the canal over the Skeathorn Road is also being constructed. The purifying-houses, which are being built between the retort-house and the Kelvin, are well advanced. Three gasholders, each 160 feet in diameter, and each capable of containing about 1,250,000 cubic feet of gas, are to be erected, and one of these is rapidly approaching completion. The gas is to be conveyed into the city through mains 48 inches in diameter, diminishing to 36 and 30 inches. These mains have been already laid down as far as the Garrioch Road. They will be carried thence through the Gairbraid estate to the east bank of the Kelvin, Mr. Davidson, of Ruchill, having given his permission to do so free of all charge. A new bridge will be thrown across the Kelvin to bring the mains into the works, and a considerable improvement will thereby be made upon the public road.

In connexion with the Dawsholm establishment, a chemical work has been erected for utilizing the tar, ammoniacal liquor, &c, produced in the manufacture of gas. It occupies a site to the north of the gas-works, and has been let to Messrs. Peter Lawson and Sons, of Edinburgh. It is at present in course of being fitted up; and we believe they will be ready to begin operations in the course of a few weeks with the progress of the existing gas-works.

At the close of the inspection the committee had dinner in an improvised hall in connexion with the new chemical work. The Lord Provost presided, and Bailie Moir was croupier.

After dinner, the LORD PROVOST gave the usual loyal toasts, which were duly honoured.

The LORD PROVOST afterwards proposed, "Success to the Corporation Gas-Works." There was no doubt, he said, that the city of Glasgow was as well lighted as any city in the kingdom, and, if they considered the quality of the gas, it was lighted as cheaply, if not more cheaply, than any other city. He was old enough to remember when the gas was introduced into Scotland—at least into Glasgow, and he would never forget the extraordinary effect produced on the aspect of the town from the former gloom and dullness to cheerfulness and comfort. Since that time the progress in the use of gas had been very great. There was then a strong prejudice against the use of gas—people were afraid to take it in their houses; but now gas was used in every city, in every little village and town, throughout the kingdom. He was much struck at hearing the other day that gas was now being introduced into vessels, for lighting them during long voyages; and he believed that arrangements were being made for lighting Cumberland training-ship with gas. When the corporation took over the works from the gas companies about three years ago, he believed they did a good thing both for the public and for the gas shareholders. It was true they gave them 1 per cent. less than they were receiving; but they gave them a security much more certain and permanent, and which he believed now sold higher than the price of the shares at that time. He was sure they had all been greatly gratified at what they had that day seen, at the great change which had taken place in the past three years upon the gas-works. They had, during that time, erected two large gasometers at Dalmarnock and one at Tradeston; and they were now erecting works at Maryhill, which would greatly increase the supply. When they took over the gas-works, the supply of gas amounted to 6½ million cubic feet per day. Last year they supplied 9 millions, and this year they would be prepared to supply 10 millions. With the increase of the population, it was indispensable that such an addition should be made. The committee had been disappointed that so small progress had been made in the erection of the Dawsholm works, but they were in hopes that measures would be taken to press them forward, as it was necessary that they should keep ahead of the demands of the inhabitants; and any outlay that might be incurred would, he was sure, be amply repaid. In carrying out the arrangements in connexion with the acquisition of this ground they had been met with the greatest liberality by Sir George Campbell, and any little difference that yet remained would, he hoped, be satisfactorily settled.

Bailie MOIR, in acknowledging the toast, said the commissioners had every reason to congratulate themselves on the success which had attended the acquisition of the works. It was impossible for him to forget the storm of indignation that arose at the time the proposal was made, and he had a disagreeable recollection of being driven out of the Gas Committee by his constituents. However, his opinion never changed. He was always a warm supporter of the movement for the acquisition of the gas-works, and he was glad that the result had turned out as he and others had anticipated. He had no hesitation in saying that this very year, in consequence of the supply of gas being in the hands of the corporation, the saving to the inhabitants would be not less than £25,000. He was satisfied that, considering how every man had at present to dip into his pocket for every waggon of coals, they might have levied an increased rate this year, without the slightest complaint. Fortunately they did not require to do so, and for this they were much indebted to Mr. Foulis, who brought so much ability to bear on the management of their affairs. He asked them to drink the health of Mr. Foulis, and long might he continue to take charge of their affairs.

Mr. FOULIS returned thanks.

Mr. MILLER gave the health of Sir George Campbell and the proprietors in the neighbourhood, who had accommodated them with a site for the new gas-works. They were much indebted to Sir George Campbell for having given them such a remarkably suitable piece of ground; and they had also to thank Mr. Davidson, of Ruchill, for allowing them to lay their mains through his ground free of all charge.

Sir GEORGE CAMPBELL, in replying, said that he thought every proprietor in the vicinity of a large town should do the best he could for the corporation, for in doing so he was, generally speaking, in the long run benefiting himself.

The LORD PROVOST gave the health of Mr. T. G. Wright, to whom the commissioners were much indebted for the great legal acumen and sound judgment he brought to bear on all the business submitted to him, and for the kindness and pleasantness of manner which he displayed in all his intercourse with the members.

Mr. WRIGHT acknowledged.

Mr. MORRISON proposed the health of his lordship, and expressed the satisfaction the company had felt at his lordship's conduct in the chair.

The LORD PROVOST replied briefly; and this terminated the proceedings.—*Glasgow Herald.*

THE OXY-HYDRIC LIGHT.—A correspondent kindly sends us an account of the works of the Buffalo (U.S.A.) Oxygen Gaslight Company, which appear to be on a larger scale than any before started for the supply of oxygen and carburetted hydrogen gases. The oxygen furnace has twenty retorts, ten on each side, each retort capable of producing 2000 feet, or, in the aggregate, 40,000 feet every twenty-four hours. The hydrogen furnace has the same number of retorts, each retort capable of producing 6000 feet, or an aggregate of 120,000 feet every twenty-four hours. Each oxygen retort contains 800 lbs. of manganate of soda. The holders, one for oxygen and the other for carburetted hydrogen, are each 60 feet in diameter and 22 feet high. We are not certain that the process by which the hydrogen is produced has been described in this JOURNAL. It is as follows:—Superheated steam is sent through a retort containing coke heated to redness, by which means hydrogen and carbonic oxide are produced. The mixture of steam and the two gases is carried on to another retort containing hydrate of lime. Here the carbonic oxide is transformed to carbonic acid, which combines with the lime, and pure hydrogen passes on to the gasholder. The carbonic acid is subsequently driven from the carbonate of lime by a current of steam, and hydrated lime reproduced for another operation. Whatever may be the succes of the oxy-hydric light in Buffalo, the same company, we read, proposes to supply coal gas, which does not look as though they felt certain of the ultimate triumph of the new light.

MANCHESTER CORPORATION GAS-WORKS.

Report of the Gas Committee for the Year Ending June 24, 1872.

The Gas Committee present the following report:—

Your committee submit herewith an abstract of the accounts of this department for the year ending the 24th of June last, and also the usual tabular statements.

Appendix A shows the amount of lamp and private rental derived from the townships within and beyond the city respectively, for the past two years.

Appendix B, the quantity of gas transmitted from the works in the day-time, and during the whole 24 hours of the day in each month, for the years 1870-71 and 1871-72.

Appendix C, the number of meters in use on the 24th of June, 1871 and 1872.

Appendix D, the main-pipes laid to the 24th of June, 1871, and those laid and taken up during the year ending the 24th of June, 1872.

Appendix E, the amount of profit, and the mode of its appropriation; the amount of borrowed money owing, and the excess of assets, &c., in each year from 1862 to the 24th of June last.

The rental for the past year (including meter-rents) has amounted to the sum of £245,889 11s., being an increase of £11,691 18s. 8d. upon that of the previous year.

The amount of profit is £63,257 9s. 7d., as against £79,322 9s. 5d. in the previous year, and is appropriated as follows:—Interest, £18,539 19s. 6d.; transferred to capital account towards liquidation of the mortgage debt, £27,805 15s. 11d.; surplus to be paid over for improvement purposes, £16,911 14s. 2d.

In addition to £16,911 14s. 2d., the amount of the surplus profit, the further sum of £13,223 10s. 3d. will, in accordance with the arrangement sanctioned by the council on the 4th day of March, 1868, be paid over for improvement purposes, making together the sum of £30,205 4s. 5d.

The number of consumers has increased 4·77 per cent., amounting now to 61,479, as against 58,676 the previous year.

The quantity of gas supplied has exceeded that of the previous year by 97,376,000 cubic feet, or 6·13 per cent.

Your committee also submit the reports of Mr. John Leigh, the consulting and analytical chemist to this department, and Mr. Edward Andrew, the accountant appointed by the council to audit the accounts for the past year:—

"*Office of Health Department, Town-Hall, Manchester, Aug.* 29, 1872.

"*To the Chairman of the Manchester Gas Committee.*

"Sir,—I have the honour to report to you that the average illuminating power of the Manchester gas during the past year has been equal to that of 20·18 candles, differing from that of the preceding year by little more than one-tenth of a candle.

"The gas has been tested photometrically at the Gaythorn and at the Rochdale Road stations almost daily. The standard of comparison adopted has been the light of a London standard sperm candle burning at the rate of 120 grains per hour, the consumption of the gas having been reduced to five cubic feet per hour.

"The gas has been tested daily for sulphuretted hydrogen and for ammonia. It has also been allowed to flow continuously through test solutions, and the amount of impurity in large volumes of the gas has been determined.

"To the daily tests it has scarcely at any time yielded a trace of sulphuretted hydrogen. From the larger volumes tested (from 100 to 1000 cubic feet) never more than a small fraction of a grain of sulphuretted hydrogen has been separated.

"The quantity of ammonia has generally been very small, but the gas has occasionally shown an undue proportion.

"The gas has been fairly free from naphthaline, and from oily and tarry matter.

"I have the honour to be, sir,

"Yours very respectfully,

(Signed) "John Leigh, M.R.C.S., &c."

"61, *Princess Street, Manchester, Aug.* 30, 1872.

"*To the Gas Committee of the Manchester Corporation.*

"Gentlemen,—Having completed the examination of the gas accounts for the year ending June 24, 1872, I have much pleasure in presenting you with my report.

"I beg to state that I have most carefully audited the books and accounts, have examined all the various vouchers, and given (as I did the year before as auditor) my especial care and attention to the gas rental and collectors accounts, and also the mortgage debt, and I hereby certify that I have found everything correct and satisfactory, as shown by the balance-sheet.

"Thanking you for the confidence you have placed in me for the past two years, and hoping to receive your consideration again at some future time as auditor.

"I remain, yours most obediently,

(Signed) "Edward Andrew."

The outlay on capital account during the past year has amounted to £28,651 1s. 6d., particulars of which will be seen on reference to the general summary of receipts and expenditure, and the statement of assets and liabilities.

Having regard to the large decrease which has taken place in the profit for the past year, amounting to £16,070 19s. 10d., and the prospect of a still further diminution during the current year, consequent upon the increased cost of materials and labour, your committee have, after careful consideration, resolved to recommend the council to advance the price charged for gas 2d. per 1000 cubic feet, in all the districts except those situate beyond the river Mersey (in which the prices now charged are exceptional by agreement), such advance to take effect from the 29th of September next.

By the adoption of this recommendation, it is estimated that the gas-rental, at the present rate of consumption, and consequently the profit, will be increased by the sum of £12,000 per annum or thereabouts. In addition to this amount, credit may be taken for the sum of £10,000, the estimated increase in the amount that may be received for coke during the current year, and also £2500 the estimated profit upon increased consumption of gas, making together the sum of £24,500, which your committee anticipate will enable them to meet the extra charges for materials and labour, and pay over to the improvement committee such a balance as will be satisfactory to the council.

On behalf of the Gas Committee,

John King, Jun., Chairman.

Gas Offices, Albert Chambers, Albert Square, Aug. 31, 1872.

Dr. — *Profit and Loss Account, for the Year ending June 24, 1872.* — *Cr.*

To Cannel					£128,533	13	11
Retort men's wages					22,936	18	5
Retorts, materials, and setting					4,693	18	7
Purifying charges					3,071	17	3
Labourers wages, and repairs, &c., of works—							
Gaythorn station	£5,937	0	3				
Rochdale Road station	5,192	0	3				
Street-mains	5,278	5	0				
Droylsden works	121	7	1				
				16,528	12	7	
Salaries				8,863	19	1	
Collectors poundage, &c.				4,170	12	0	
Chief and other rents and rates, &c.—							
Chief rents	£322	14	7				
Rates and rent of offices	714	13	0				
Rates on stations and street-mains	4,311	10	4				
				5,348	17	11	
Income-tax				2,010	10	3	
Amount transferred to capital account for depreciation of works—							
Gaythorn station—							
4 p. ct. on buildings (£79,499 17s. 1d.)	£3,179	19	10				
5 p. ct. on apparatus (£46,602 0s. 3d.)	2,330	2	0				
				£5,510	1	10	
Rochdale Road station—							
4 p. ct. on buildings (£113,818 5s.)	£4,552	14	7				
5 p. ct. on apparatus (£59,474 7s. 4d.)	2,973	14	4				
				7,526	8	11	
Droylsden works—							
4 p. ct. on buildings (£7,326 5s. 1d.)	£293	1	0				
5 p. ct. on apparatus (£7,647 11s. 5d.)	382	7	9				
2½ p. ct. on main-pipes (£2,686 7s. 2d.)	67	3	2				
10 p. ct. on meters and service-pipes (£832 11s.)	83	5	1				
				825	17	0	
Street-mains store (Poland Street)—							
4 p. ct. on buildings (£1721 6s. 1d.)	£68	17	0				
5 p. ct. on apparatus (£447 7s. 10d.)	22	7	5				
				91	4	5	
Street-mains—							
2½ per cent. on main-pipes (£219,386 2s. 11d.)				5,484	14	1	
Hired meters and fittings—							
10 per cent. on £28,362 4s. 7d.				2,836	4	6	
Meter-proving apparatus—							
10 per cent. on £87 13s. 11d.				8	15	11	
				22,283	6	8	
Stationery and advertising				468	8	10	
Law stationery, receipt, postage, and deed stamps, &c.				277	8	0	
Clothing for inspectors, &c.				298	14	6	
Subscriptions to Infirmary, Eye Hospital, &c.				81	11	0	
Repairs of hired meters				152	17	8	
Miscellaneous expenses				512	1	7	
Commission, &c., charged by bankers				193	5	1	
Bad debts				774	0	5	
Balance carried down				63,257	9	7	
				£284,458	3	4	
Interest on loans, &c. (less income-tax)				£18,539	19	6	
Amount transferred to capital account, towards liquidation of mortgage debt				27,805	15	11	
Surplus payable to the improvement department				16,911	14	2	
				£63,257	9	7	

By Gas-rental—							
Within the city—							
Private consumers	£178,505	13	8				
Meter-rents	3,641	5	7				
Public lamps	9,662	5	1				
				£191,809	4	4	
Beyond the city—							
Private consumers	£49,686	9	4				
Meter-rents	884	7	3				
Public lamps	3,509	10	1				
				54,080	6	8	
				£245,889	11	0	
Coke				20,485	2	3	
Tar				12,896	17	6	
Ammonia water				5,186	12	7	
				£284,458	3	4	
By balance brought down, being gross profit on the year's working				£63,257	9	7	
				£63,257	9	7	

Dr. — *General Summary of Receipts and Expenditure on Capital and Revenue Account, June* 24, 1872. — *Cr.*

To Balance in the bank, June 24, 1871				£11,069	19	3	
Ditto in the treasurer's hands, June 24, 1871				139	19	10	
Ditto of sums owing to and by the committee, including stocks on hand, June 24, 1871				51,590	2	9	
				£62,800	1	10	
Balance of profit and loss account, as per statement				16,911	14	2	
Loans received				45,250	0	0	
Materials sold (capital account) as per statement				26	14	4	
Amount transferred from revenue account—							
For depreciation of works				22,283	6	8	
Liquidation of mortgage debt				27,805	15	11	
				£173,077	12	11	

By Loans repaid						£30,250	0 0
Improvement and Chorlton-upon-Medlock Committees—							
Surplus for the year ending June 24, 1871				£33,042	13 1		
Retained towards repayment of advances				5,922	1 2		
Expenditure on capital account, viz.—						28,920	11 11
Gaythorn station				£1,595	3 2		
Rochdale Road ditto				13,229	12 1		
Droylsden works				316	5 10		
Street-mains				7,769	14 5		
Service-pipes (one moiety)				1,065	16 7		
Hired meters				4,674	7 5		
						28,651	1 6
Balance in the bank, June 24, 1872				£31,140	8 4		
Ditto in the treasurer's hands, June 24, 1872				262	5 10		
						31,402	14 2
Ditto of sums owing to and by the committee, including stocks on hand, June 24, 1872						54,753	5 4
						£173,077	12 11

Statement of Assets and Liabilities, June 24, 1872.

PERMANENT ASSETS.

Lower King Street station—					
Land (now let to the Watch Committee, at an annual rent of £300)					£7,500 0 0
Gaythorn station—					
Land, buildings, and apparatus, as per last report—					
Land	£55,435 6 10				
Buildings	79,499 17 1				
Apparatus	46,602 0 5				
		£181,537 4 2			
Less—					
Depreciation		5,510 1 10			
		£176,027 2 4			
One year's outlay to June 24, 1872—					
Yard-mains	182 19 9				
New purifying-house	623 0 10				
No. 2 retort-house	125 19 9				
River Street wall	6 18 0				
New meter and governor house	495 10 9				
Ammonia water condensers	170 14 1				
		1,595 3 2			
					177,622 5 6
Rochdale Road station—					
Land, buildings, and apparatus, as per last report—					
Land	£26,796 3 1				
Buildings	113,818 5 0				
Apparatus	59,474 7 4				
		£200,088 15 5			
Less—					
Depreciation		7,526 8 11			
		£192,562 6 6			
One year's outlay to June 24, 1872—					
Yard-mains	£65 0 1				
New purifying-house	2,930 8 5				
New engine and exhauster house	365 0 9				
New cannel-stores (adjoining Dewhurst Street)	9 7 6				
No. 3 retort-house	3,356 19 1				
New offices	61 13 2				
New experimental apparatus	33 5 9				
Revivifying shed and tar-well	1,517 17 10				
New coke-hoist	80 0 0				
Newtown tanks	1,335 15 5				
Ditto gasholders	2,858 19 1				
River wall, Newtown	415 5 0				
		13,229 12 1			
					205,791 18 7
Droylsden works—					
Buildings and apparatus, as per last report—					
Buildings	£7,297 8 11				
Apparatus	11,195 5 9				
		£18,492 14 8			
Less—					
Materials sold	£26 14 4				
Depreciation	825 17 0				
		852 11 4			
		£17,640 3 4			
One year's outlay to June 24, 1872—					
Buildings	£42 8 4				
Apparatus	199 6 2				
Main pipes	30 7 4				
Meters and service pipes	44 4 0				
		316 5 10			
					17,956 9 2
Bradford Road—					
Land purchased, as per last report					30,251 18 0
Street-mains store (Poland Street)—					
Land, buildings, and apparatus, as per last report—					
Land	£1,406 0 0				
Buildings	1,721 6 1				
Apparatus	447 7 10				
		£3,574 13 11			
Less—					
Depreciation		91 4 5			
					3,483 9 6
Street-mains—					
Main-pipes, as per last report	£219,388 2 11				
Less—					
Depreciation	5,484 14 1				
		£213,903 8 10			
One year's outlay to June 24, 1872		7,769 14 5			
					221,673 3 3
Service-pipes—					
Service-pipes laid, as per last report		£18,001 11 9			
Moiety of year's outlay charged to capital account		1,065 18 7			
					19,067 10 4
Hired meters, &c.—					
Outlay, as per last report	£28,362 4 7				
Less—					
Depreciation	2,836 4 6				
		£25,526 0 1			
One year's outlay to June 24, 1872		4,674 7 5			
					30,200 7 6
Meter-proving apparatus—					
Outlay, as per last report		£87 18 11			
Less—					
Depreciation		8 15 11			
					79 3 0
Total amount of permanent assets					£713,626 4 10

FLOATING ASSETS.

Cannel, retorts, and other materials on hand—			
Revenue account	£53,778 12 0		
Gas-rents, and sundry accounts due to the committee—			
Revenue account	51,952 10 9		
Extension ditto	130 16 0		
Amount paid in advance to the improvement department, in anticipation of future profits	23,191 6 11		
Balance in the bank	31,140 8 4		
Ditto in the treasurer's hands	262 5 10		
		159,455 19 10	
		£873,082 4 8	
Excess of assets, June 24, 1872		£341,718 7 8	
Ditto of assets, June 24, 1871		313,912 11 9	
Increase, being the amount charged upon the profit for the past year towards liquidation of the mortgage debt		£27,805 15 11	

LIABILITIES.

Mortgage debt—				
Act of 1844—1st charge	£55,651 0 9			
Ditto—2nd ditto	21,147 18 4			
Ditto of 1854	40,610 0 0			
Ditto of 1858	98,252 10 0			
Ditto of 1867	186,682 0 4			
Total amount secured by mortgage		£442,343 9 5		
Sums advanced, not secured by mortgage at this date—				
John A. Bouck	£1,500 0 0			
Indian Relief Fund Committee	4,500 0 0			
Admiral Duff's Charity	1,250 0 0			
Water-Works Committee	10,000 0 0			
		17,250 0 0		
				£459,593 9 5
Purchase of land, the purchase-money being left in the hands of the committee, at interest				1,750 0 0
Sundry accounts owing—				
Revenue account	£37,223 8 7			
Extension ditto	3,202 3 3			
				40,425 11 9
Deposits in hand				11,683 1 8
				£513,452 2 10
Surplus for the year ending June 24, 1872, payable to the improvement department				16,911 14 2
Balance, being excess of assets				341,718 7 8
				£873,082 4 8

[APPENDIX A.]

Statement of the Lamp and Private Rental (including Meter-Rents) derived from the Townships within and beyond the City respectively, for the Years 1870-71 *and* 1871-2.

	Half Year ending Dec. 25, 1870.		Half Year ending June 24, 1871.		Total for the Yr. 1870-71.	Half Year ending Dec. 25, 1871.		Half Year ending June 24, 1872.		Total for the Year 1871-72.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Within the city—										
Township of Manchester—										
Private rental	52274 1 1		56111 11 1			56353 4 4		56900 12 10		
Public lamps	2747 9 3		2424 9 11			2773 6 5		2520 2 7		
		55021 10 4		58536 1 0			59126 10 9		59420 15 5	
Other townships—										
Private rental	32488 2 10		34338 8 6			34239 17 2		34653 4 11		
Public lamps	2123 1 3		2141 11 11			2168 5 2		2200 10 11		
		34611 4 1		36480 0 5			36408 2 4		36853 15 10	
Total within the city		89632 14 5		95016 1 5	184648 15 10		95534 13 1		96274 11 3	191809 4 8
Beyond the city—										
Private rental	21625 5 0		22054 9 7			23902 8 0		23797 15 8		
Public lamps	1521 9 9		1581 13 7			1616 0 3		1675 4 4		
Total beyond the city		23146 14 9		23636 3 2	46782 17 11		25518 8 3		25473 0 0	50991 8 3
Gross rental		112779 9 2		118652 4 7	231431 13 9		121053 1 4		121747 11 3	242800 12 7
Add Droylsden					2765 18 7					3088 18 5
Total					£234197 12 4					£245889 11 0

Within the city: Gross rental (1870-71) £184,648 15s. 10d.; ditto (1871-72) £191,809 4s. 4d.; increase, £7160 8s. 6d. **Beyond the city:** Gross rental (1870-71) £46,782 17s. 11d.; ditto (1871-72) £50,991 8s. 3d.; increase, £4208 10s. 4d. **Droylsden:** Gross rental (1870-71) £2765 18s. 7d.; ditto (1871-72) £3088 18s. 5d.; increase, £322 19s. 10d. **Total Gross rental:** (1870-71) £234,197 12s. 4d.; ditto (1871-72) £245,889 11s.; increase, £11,691 18s. 8d.

[APPENDIX B.]

Comparative Statement of the Quantity of Gas transmitted from the Works, in the Day-time and during the Twenty-four Hours, for the Years 1871-72.

	Day-time.				Twenty-four Hours.			
	1870-71.	1871-72.	Increase.	Decrease.	1870-71.	1871-72.	Increase.	
	Cubic Feet.	Cubic Feet.	Per cent.	Per cent.	Cubic Feet.	Cubic Feet.	Per cent.	
July	12,532,000	16,081,000	28·31	....	57,313,000	67,167,000	17·19	....
August	13,503,000	14,161,000	4·87	....	71,958,000	76,373,000	6·27	....
September	16,125,000	18,360,000	13·86	....	99,412,000	106,064,000	6·69	....
October	27,887,000	26,124,000	....	6·32	153,110,000	162,605,000	6·20	....
November	33,246,000	35,070,000	5·48	....	200,995,000	209,637,000	4·29	....
December	45,512,000	46,583,000	2·35	....	229,553,000	239,985,000	4·54	....
January	46,872,000	41,166,000	....	12·17	219,414,000	229,262,000	4·48	....
February	26,782,000	29,223,000	9·11	....	164,316,000	178,463,000	8·61	....
March	22,338,000	24,704,000	10·59	....	136,527,000	139,840,000	2·42	....
April	21,163,000	22,351,000	5·61	....	101,617,000	103,475,000	1·82	....
May	16,251,000	19,598,000	20·59	....	77,208,000	85,115,000	10·24	....
June	14,469,000	16,917,000	16·91	....	59,889,000	68,503,000	14·38	....
	296,680,000	310,388,000	4·60	....	1,571,312,000	1,666,489,000	6·05	....
Add Droylsden	..	..	....	....	16,804,000	19,003,000	13·08	....
Total	..	..	....	....	1,588,116,000	1,685,492,000	6·13	....

During the day-time (1870-71) 296,680,000 cubic feet; (1871-72) 310,388,000 cubic feet; increase, 13,658,000 cubic feet. During the twenty-four hours (1870-71) 1,571,312,000 cubic feet; (1871-72) 1,666,489,000 cubic feet; increase, 95,177,000 cubic feet; add increase at Droylsden, 2,199,000 cubic feet; total increase, 97,376,000 cubic feet.

[APPENDIX C.]

Table showing the Number of each Size of Meter in use on the 24th of June, 1871 *and* 1872 *respectively, including those on Hire.*

Size of Meters.	Townships within the City.														Townships beyond the City.		Total.		Increase.	Decrease.
	Manchester.		Chorlton-u.-Medlock.		Hulme.		Ardwick.		Beswick.		Cheetham.		Total within the City.							
	1871.	1872.	1871.	1872.	1871.	1872.	1871.	1872.	1871.	1872.	1871.	1872.	1871.	1872.	1871.	1872.	1871.	1872.		
1 light	54	49	12	12	28	23	17	15	..	..	3	..	114	99	5	4	119	103	..	16
2 lights	10694	11123	3369	3568	6314	6476	2241	2363	243	322	1514	1500	24375	25287	7118	7828	31493	33115	1622	..
3 ,,	4027	3987	2103	2153	2147	2157	649	672	23	51	1054	1105	10003	10125	2597	2903	12600	13028	428	..
5 ,,	2556	2589	1411	1414	645	667	276	299	15	25	731	763	5634	5757	1986	2206	7620	7963	343	..
10 ,,	1426	1540	426	428	182	189	97	99	6	7	194	222	2331	2485	745	787	3076	3272	196	..
20 ,,	783	839	135	110	62	66	40	40	1	1	47	50	1068	1106	275	292	1343	1398	55	..
30 ,,	336	357	27	26	28	31	10	8	3	2	19	17	423	441	88	97	511	538	27	..
45 ,,	41	40	4	4	1	2	3	3	..	..	..	..	49	49	9	8	58	57	..	1
50 ,,	212	228	17	17	10	13	9	11	2	2	12	13	262	284	47	53	309	337	28	..
60 ,,	93	99	2	5	15	17	3	1	..	..	6	6	119	128	14	15	133	143	10	..
80 ,,	82	88	6	6	7	7	1	2	..	..	..	..	96	103	10	13	106	116	10	..
100 ,,	119	135	7	7	8	9	6	5	1	1	6	7	147	164	27	26	174	190	16	..
150 ,,	42	47	6	7	5	6	2	3	..	..	1	2	56	65	10	10	66	75	9	..
200 ,,	14	16	..	..	4	4	..	..	..	..	3	3	21	23	7	9	28	32	4	..
250 ,,	2	2	..	..	..	..	..	..	1	1	..	..	3	3	..	..	3	3	..	..
300 ,,	16	17	1	1	2	2	..	..	..	..	3	3	22	23	9	9	31	32	1	..
500 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..	..
600 ,,	1	1	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	1	..	..
1000 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	..
Total	20498	21157	7526	7693	9458	9669	3354	3521	295	412	3593	3691	44724	46143	12948	14262	57672	60405	2750	17

Add Droylsden, 1074; total meters, 61,479. Add Droylsden, increase 70; total increase, 2820. Deduct decrease, 17; net increase, 2803 meters = 4·77 per cent.

Statement showing the Number and Sizes of Meters on Hire on June 24, 1872 *(included in the above Table).*

	1 Light.	2 Lights.	3 Lights.	5 Lights.	10 Lights.	20 Lights.	30 Lights.	50 Lights.	60 Lights.	80 Lights.	100 Lights.	150 Lights.	Total, 1871.	Total, 1872.	Increase.
Within the city	97	11623	3655	1559	358	69	23	12	9	2	5	1	16121	17413	1292
Beyond the city	4	2481	938	674	89	6	2	1	3	..	..	..	3459	4198	739
Total	101	14104	4593	2233	447	75	25	13	12	2	5	1	19580	21611	2031

[APPENDIX D.]

Mains Laid and Taken up during the Year ending June 24, 1872.

Laid.	Diam. 2 in.	Diam. 3 in.	Diam. 4 in.	Diam. 5 in.	Diam. 6 in.	Diam. 8 in.	Diam. 9 in.	Diam. 12 in.	Diam. 14 in.	Diam. 15 in.	Diam. 18 in.	Diam. 30 in.	Total Length.
	Yds.	Yds	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.
Within the city—													
Manchester	6358	2072	1203	..	558	88	..	85	..	..	30	7	10491
Chorlton-upon-Medlock	2285	1006	..	..	47	90	..	..	..	..	..	..	3428
Hulme	1549	40	..	10	..	..	..	..	..	..	..	..	1599
Cheetham	468	46	340	..	120	..	..	..	..	..	..	..	914
Ardwick (including Beswick)	2159	..	..	33	..	..	..	..	..	..	..	..	2192
	12759	3164	1633	43	725	178	..	85	..	..	30	7	18624
Beyond the city	11142	3338	4204	3	3783	3356	2822	2650	12	8	2421	..	33739
Total	23901	6502	5837	46	4508	3534	2822	2735	12	8	2451	7	52363
Taken up.													
Within the city	811	821	788	45	..	78	..	142	..	..	..	..	2685
Beyond the city	1742	2420	2011	..	..	1968	..	..	..	..	..	..	8141
Total	2553	3241	2799	45	..	2046	..	142	..	..	..	..	10826

Net increase during the year, 41537 yards.

[APPENDIX D—*continued.*]

Summary.

	Diam. 2 in.	Diam. 3 in.	Diam. 4 in.	Diam. 5 in.	Diam. 6 in.	Diam. 7 in.	Diam. 8 in.	Diam. 9 in.	Diam. 10 in.	Diam. 11 in.	Diam. 12 in.	Diam. 13 in.	Diam. 14 in.	Diam. 15 in.	Diam. 16 in.	Diam. 18 in.	Diam. 20 in.	Diam. 22 in.	Diam. 24 in.	Diam. 30 in.	Total Length
Pipes laid to June 24, 1871—	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.	Yds.
Within the city	206264	120070	47172	15315	28124	736	14395	13544	1438	353	28856	309	7213	4792	4043	5228	324	477	6782	2513	507968
Beyond the city	92376	49870	42102	6200	23110	410	23250	10695	721	1808	17815	..	737	37	..	1610	..	..	315	..	271056
Pipes laid during the year ending June 24, 1872—	298640	169940	89274	21515	51234	1166	37645	24239	2159	2161	46671	309	7950	4829	4043	6838	324	477	7097	2513	779024
Within the city	12759	3164	1633	43	725	..	178	..	..	..	85	..	..	..	..	30	..	..	..	7	18624
Beyond the city	11142	3338	4204	3	3783	..	3356	2822	..	..	2650	..	12	8	..	2421	..	..	..	..	33739
	322541	176442	95111	21561	55742	1166	41179	27061	2159	2161	49406	309	7962	4837	4043	9289	324	477	7097	2520	831387
Deduct taken up	2558	3241	2799	45	..	..	2046	..	..	..	142	..	..	..	..	..	..	..	..	..	10826
	319983	173201	92312	21516	55742	1166	39133	27061	2159	2161	49264	309	7962	4837	4043	9289	324	477	7097	2520	820561
Add, mains in connexion with the Droylsden Works	5567	2197	4155	418	1327	..	351	..	606	..	..	..	..	..	..	..	..	..	..	..	14621
Total	325555	175398	96467	21934	57069	1166	39484	27061	2765	2161	49264	309	7962	4837	4043	9289	324	477	7097	2520	835182*

* Total, 835,182 yards, or 474½ miles and 62 yards.

[APPENDIX E.]

Statement showing the Amount of Gross Profit, and the Mode of its Appropriation; also the Amount of Borrowed Money Owing, and the Excess of Assets, &c., from the Year 1862 to the present Date.

Year ending June 24.	Profit.	Maximum Price of Gas, per 1000 Feet, within the City.	Appropriation of Gross Profits. Interest.	Liquidation of Mortgage Debt.	Surplus.	Amount advanced to Imprvmnt. Commte. in anticip'tion of future Profits.	Paid over for Improvement Purposes.	Retained tow'rds Repayment of Advances made to the Imprvmnt. Committee in anticipation of future Profits.	Balance owing of Amounts advanced in anticip'tion of future Profits.	Borrowed Money Owing.	Amount charged to Revenue in respect of Depreciation of Works and Mains.	Excess of Assets.
	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1862	42667 7 1	4 0	15462 3 2	19330 14 4	7854 9 7	....	7854 9 7	....	....	382539 7 10	12179 4 11	126591 4 6
1863	55804 12 9	Half year 4 0; " 3 9	14932 17 8	18609 17 4	22261 17 9	....	22261 17 9	....	....	362877 8 10	12666 18 11	145201 1 10
1864	59545 18 9	Half year 3 9; " 3 6	13888 12 10	17810 1 0	27847 4 11	....	27847 4 11	....	....	335808 16 9	12690 12 9	163011 2 10
1865	56492 4 5	Half year 3 6; " 3 2	13086 10 9	17587 0 11	25758 12 9	....	25758 12 9	....	....	306951 2 2	13050 6 6	180598 3 9
1866	52553 2 10	3 2	13252 13 0	19784 2 0	19516 7 10	....	19516 7 10	....	....	347472 2 11	13817 2 9	206382 5 9
1867	47323 0 4	3 2	14167 11 7	19898 0 4	13257 8 5	....	13257 8 5	....	....	331725 9 7	14628 8 6	220280 6 1
1868	49546 4 7	3 2	14314 17 9	20246 0 5	14985 6 5	13059 8 5	28044 14 10	....	....	351035 10 4	15173 2 5	239685 15 6
1869	52736 18 4	3 2	15467 12 6	22688 14 4	14580 11 6	11303 19 8	25884 11 2	....	24863 8 1	395469 8 5	15387 15 7	262374 9 10
1870	65348 10 8	3 2	16784 13 8	24487 6 0	24071 11 0	3750 0 0	27821 11 0	....	28113 8 1	432941 1 9	17633 5 10	286861 15 10
1871	79822 9 5	3 2	18329 0 5	27050 15 11	33942 13 1	....	28020 11 11	5922 1 2	22191 0 11	448593 9 5	19602 10 5	313912 11 9
1872	63257 9 7	3 2	18339 19 6	27805 15 11	16911 14 2	13293 10 3	30205 4 5	....	35484 17 2	459593 9 5	22283 6 8	431748 7 8
Total	624532 18 9	..	168246 12 10	235298 8 6	220907 17 5	41406 18 4	256472 14 7	5922 1 2	....	....	169112 15 3	....

BIRMINGHAM WATER-WORKS COMPANY.

The Half-Yearly Ordinary Meeting of the Shareholders in this Company was held on Wednesday, the 18th inst.—Mr. W. JAMES in the chair.

The following report by the directors was presented—

The directors deeply regret to report the death of their colleague, Mr. Abel Rollason, who for upwards of ten years was a director of your company. To fill up the vacancy thus occasioned they have appointed Mr. George Heaton, of Church Hill, Handsworth. The directors have to report that the water-rental for the last half year amounted to £30,738 0s. 3d., exceeding that of the corresponding half year of 1871 by £2127 4s. 4d., and that of the half year ending the 31st of December last by £804 5s. 9d.; the rental for the year 1872 exceeding that of the year 1871 by £4920 0s. 6d. The profit of past half year is £15,351 15s. 5d., being less than that of the corresponding half year of 1871 by £558 1s. 6d., and less than that of the half year ending the 31st of December last by £1711 14s. 2d.; the total profit of the year 1872 being more than that of the year 1871 by the sum of £810 9s. 1d. The profit and loss account for the half year ending the 31st of June, 1872, and the balance-sheet of that date, are now submitted to you. The increased charge under the head of working engines and wages is due to the high price of coal and to an advance in wages. The law charges during the past half year have been larger than usual, in consequence of the opposition which the directors thought it necessary, in the interest of the company, to offer to several bills brought before Parliament. The directors believe that the changes introduced into the bills in question at their instance justify the expenditure incurred.

The profits of the past half year, viz., £15,351 15s. 5d., added to £5429 6s. 10d., balance of previous profit not divided, make a total of £20,781 2s. 3d. The directors recommend that a dividend, at the rate of 6½ per cent. per annum upon the paid-up capital, be this day declared; which dividend will amount to £17,343 6s. 8d., leaving a balance of £3437 15s. 7d., profit undivided, to be carried forward to the next account. The directors recommend that the dividends be paid by dividend warrants forwarded to the shareholders on the 26th instant.

The whole of the pumping establishments are in good working order. The engine, engine-house, and boiler-house at Short Heath are now complete, and a good supply of excellent water from this sinking is available for the purposes of the company. Operations are being continued at the Perry sinking with very favourable results. The reservoir and filter beds at Whitacre are now finished. The completion of the engines has been retarded from various causes. This portion of the works is now, however, progressing satisfactorily, and the engines will be ready for pumping water from the river Blythe by the end of the present year. During the past half year 48 fires have occurred within the company's district, and in all cases there has been an abundant supply of water. Forty-five of these 48 fires have been extinguished without the use of fire-engines, partly by portable engines, and partly by water delivered under pressure from the company's mains; and 6 have been on premises not supplied with water by the company. The supply of water in cases of fire is always provided by the company gratuitously.

The CHAIRMAN, in moving the adoption of the report, said that, although the company during the past half year had been put to some large expenses, they had, on the whole, been going on very well. Their works were in very good order. The directors had been over the whole of them, and he could say they were among the finest works in the kingdom. In one respect they were the very best in the kingdom, for they were not dependent upon one source of supply, as many other companies were. A single source might be large and unfailing, but it was only one source, whereas their company had five or six distinct sources of supply, and if one fell off from any cause they had the others to fall back upon. With much pride, he could say he believed their works were among the best and soundest in the kingdom. The accounts laid before the shareholders were fairly stated in every way, and he believed no one could find the slightest fault with them. He had, therefore, much pleasure in moving that the report and statement of accounts be approved.

Mr. WESTON seconded the resolution, which was passed unanimously.

On the motion of Mr. E. BARNETT, seconded by Mr. F. KNIGHT, jnn., the acts and proceedings of the board of directors since the last general meeting were approved and confirmed.

The CHAIRMAN then moved the declaration of a dividend of 6½ per cent., as recommended in the report. In doing so, he remarked that during the half year they had not earned enough to pay so large a dividend, but on previous occasions they had laid aside a portion of their profits to meet the case, in the event of the earnings of any subsequent half year being less. During the past six months their expenses had been very large, to a great extent owing to causes over which they had no control. They had, however, legitimate profits undivided upon which they could fall back. The shareholders would agree with him that it was wise to make up the dividend to the usual amount.

Mr. S. PHILLIPS seconded the motion, which was carried.

Mr. CHESSHIRE asked for information as to any arrangement with the Town Council that might be contemplated. It was of great importance that the borough should be provided with good water. There was a large number of pumps in the town, the water of which, on the authority of the borough analyst, was impure and unfit for the consumption of the lower classes; and if an arrangement could be entered into between the corporation and this company there could be no doubt, as a sanitary question, that great good would accrue. As a financial question, he thought the company were interested in bringing about such an arrangement.

The CHAIRMAN, in reply, said the Town Council some time ago passed a resolution authorizing the Public Works Committee to open communication with the directors of this company. After some delay a meeting was held of a deputation from the Town Council and the directors. The latter ascertained that the deputation had only two questions to ask—namely, whether the company would sell their property by private contract, and, if so, on what terms. The deputation had not the slightest power to negotiate or enter into any terms. The reply which the directors gave was what he considered the only possible reply under such circumstances—namely, that they were well satisfied that they had a valuable and improving concern, and had no desire to part with it. That was all that took place; there really never was any negotiation, the deputation from the Town Council having no power to treat, or do more than ask the questions he had mentioned. There were a great many sound reasons why the directors should not give any other answer than that which they did give.

Mr. JABET asked whether the corporation could have done anything more than what they did without going to Parliament.

The CHAIRMAN said they could only make a bargain subject to the sanction of Parliament. They had no power to buy. He was satisfied the directors were well advised and acted wisely. There might have been questions raised which it was not practical to state to the meeting, one of them a very serious one. They were well advised in not negotiating with parties who had no power to negotiate. The shareholders must exercise a little faith in the directors or else turn them out, and put other persons in their place.

Mr. JABET then moved a vote of thanks to the chairman and directors, and remarked that he felt there could be nothing better than for the corporation to buy the water-works. The directors were quite justified in refusing to treat with those who had no power to purchase, but the corporation should go to Parliament for power, and then come to negociate. The company might then name a price. He should be sorry to see anything like a determination on the part of the company not to treat.

Mr. E. CHESSHIRE seconded the vote of thanks, and it was unanimously passed.

The CHAIRMAN, in acknowledging the compliment, said the directors had done a great deal of hard work, and they had a great deal before them, as they were engaged in revising the water charges, a work which required great care. He did not agree with Mr. Jabet that the corporation were the best parties to have control of the water supply. He decidedly thought the Government of the country ought to have the whole supply of water in their own hands, as they were able to prevent streams being poisoned, which corporations could

not do except within the limits of the district under their jurisdiction. The sewerage of the country and the water supply should be in Government hands, but next to the Government, he thought a private company was better than a corporation. The directors were not hostile to the sale of the company's works to the corporation, but they would not wantonly place themselves in such a position as to make a bad bargain instead of a good one. At the proper time, if it ever occurred, care would be taken to deal with the corporation openly and candidly, but they would expect the same from the corporation. He thanked the shareholders for their continued confidence.

CARLISLE CORPORATION GAS AND WATER WORKS.

At the meeting of the Carlisle Town Council on the 14th inst., the annual accounts of the Gas and Water Works Committees were presented.

The gas-works accounts show that the total amount expended on permanent works to June 30 had been £33,074 8s. The profits of the past year had been £4750 10s. 6d., as set forth in the following abstract of the revenue account:—

To Stock of materials, June, 1871	£3,574	3	0	By Gas sold	£12,072	9	0
Cannel, coal, and purifying material	5,879	16	6	Coke, tar, &c., sold	2,845	0	4
Salaries and wages	3,294	8	1	Meters, fittings, &c.	2,863	14	11
Meters, fittings, &c.	2,117	3	5	Stock of materials, &c.	4,544	15	5
Sundry accounts, interest, &c.	1,989	18	2				
Balance, being profit for the year	4,750	10	6				
	£22,325	19	8		£22,325	19	8

The appropriation of those profits had been as follows:—Annual payment to corporation, £200; fishery suit, £437 17s. 2d.; amount expended on extension of works, £1187 16s. 4d.; balance, £2924 17s. The accumulated profits from the period of the acquisition of the works amounted to £41,392 19s., as shown in the following statement of "Liabilities and assets":—

To Loans on mortgage	£11,505	0	0	By Capital account	£33,074	8	0
Sundry creditors	1,749	19	9	Reserve-fund	7,468	10	0
Balance, being accumulated profits	41,392	19	1	Stock account	4,282	4	8
				Cash in hands of treasurer	2,536	16	6
				Accounts due for gas, coke, &c.	7,266	19	8
	£54,638	18	10		£54,638	18	10

The reserve-fund had been invested in the following manner:—Lowry Holme estate mortgage, £1800; water-works bonds, £463 10s.; water-works loans, £3200; Maryport and Carlisle stock, £2000; total, £7463 10s.

The water-works accounts showed that the net cost of the works to June last had been £14059 5s. 7d. The profits of the year had been £1268 6s. 5d., as shown in the following statement of the revenue account:—

To Coals, &c.	£249	7	6	By Water sold in year	£4,426	11	5
Salaries and wages	671	16	2	Pipes and castings	684	11	1
Pipes and castings	644	16	5	Stock of materials, &c.	454	6	4
Interest on mortgages	1,812	2	0				
Sundry items	928	0	4				
Balance, being profit for year	1,268	6	5				
	£5,565	8	10		£5,565	8	10

The accumulated profits from the period of the acquisition of the works had been £3691 12s. 1d., as shown in the following account of "Liabilities and assets":—

To Loans	£41,896	0	0	By Capital account	£44,059	0	7
Sundry creditors	172	8	3	Stock of materials	436	4	0
Balance, being accumulated profits	3,691	12	1	Sinking-fund	455	5	3
				Cash in treasurer's hands	474	19	2
				Accounts due for water, &c.	336	6	4
	£45,766	0	4		£45,766	0	4

GLASGOW WATER-WORKS.

Report on the Duration of the Existing Supply.

At the Meeting of the Glasgow Water Committee on the 9th inst., the Lord Provost in the chair, a report by Mr. James M. Gale, on the length of time the existing works may be expected to meet the requirements of the city, was laid on the table. At the meeting of committee held on the 15th of July last, Mr. Gale was requested to report on what length of time it appeared probable the works authorized by the Act of 1855 for supplying the city with water from Loch Katrine, together with the Gorbals Works, would be able to meet the continually increasing demand upon them. In his report, Mr. Gale first notices the works as designed. On this subject he remarks that "the commissioners have power to draw 50 million gallons a day from Loch Katrine for the use of the city, and the storage capacity of the loch, together with that at Loch Vennachar and Loch Drunkie, was designed to ensure that this supply could be maintained during the driest seasons, as well as provide for the 40,500,000 gallons a day of compensation water, which has to be passed down the river Teith. The aqueduct was also made to convey to the city about 50 million gallons a day, certain portions excepted. The Gorbals Works, when they passed into the hands of the commissioners, were known to be able to supply the city with 4 million gallons a day during a dry season, and they have continued from that time to contribute from 3 million to 4 million gallons a day. The total quantity, therefore, over which you have power, and which the works were designed to supply, is 54 million gallons a day." The engineer next refers to the aqueduct as first constructed, and the additions which were made in 1864 and in 1867 and 1868, at a cost of £52,000. "We are at present," he proceeds to say, "engaged in laying the first half, being rather more than three miles, of the two additional lines of 36-inch mains from Mugdock to the city. This work should be completed by March next, and the estimated cost, including valves and surface drainage, is close on £50,000." The works remaining to be done to complete the original design of the aqueducts will require a sum, at present prices, of not less than £200,000. With reference to the available capacity of the works, Mr. Gale says: "The storeage capacity of the lochs and the dimensions of the aqueduct have been hitherto considered as capable of supplying the city with 50 million gallons a day, but as there are certain things connected with the construction and management of the works which will prevent this ever being realized, it is necessary that I should bring them under the notice of the committee. 1. *The Maintenance of the Aqueduct:* Any loose rock that may become detached from the shafts and the roof of the tunnels requires to be removed from time to time, some leakages require to be made good, and the cast and wrought iron aqueduct bridges on the first 11 miles, already referred to, require to be frequently painted to protect them from the very corrosive action of the Loch Katrine water. To carry out these operations periodical stoppages of the flow of the water in the aqueduct are necessary; and, in addition, there are those stoppages, partial or total, which have to be made without any preconcerted arrangements being possible, when accidents happen to the syphon-pipes, as experience shows they do and will occur to all long lengths of large cast-iron pipes under great pressure, notwithstanding all the precautions taken to avoid them. It was to provide against the supply of water to the city being interrupted on these occasions that the reservoir at Mugdock was constructed, and it is necessary at all times to have a margin in the discharge of the aqueduct over the actual requirements of the city, so that the reservoir may be filled up in a moderate time after a stoppage at the loch. This margin cannot be put at less than 5 million gallons a day, or one-tenth of the total discharge of the aqueduct. The quantity of water available, therefore, for the supply of the city from Mugdock falls to be reduced to 45 million gallons a day. 2. *The Dimensions of the Aqueduct:* The aqueduct is 8 feet wide and 8 feet high throughout, but for the first 15½ miles it has upright sides and flat bottom, while the part forming the Duntreath section, rather more than 5 miles in length, has curved sides and bottom. The result of this construction is that 50 million gallons a day can be passed when it is running 6 feet 7 inches deep on the first part of the aqueduct, but it must run 7 feet 3 inches deep on the Duntreath section to pass the same quantity, being a difference of 8 inches. The bridges throughout the whole length of the aqueduct are 6 feet 6 inches deep only, so that the side walls of the masonry bridges and the cast-iron troughs of the iron bridges must be raised from 6 inches to 1 foot (to allow of a small margin) before the full quantity of water can be passed. Where the aqueduct was constructed in open cutting it was formed water-tight to a depth of 6 feet 6 inches only, so that here also there is a deficiency of 12 inches in height which will have to be made good, and there will be some difficulty in doing this. 3. *The Storeage at the Lochs:* During the summer of 1869 there occurred the most lengthened period of dry weather there had been for many years on the West Coast of Scotland. The fall of rain during March, April, May, June, July, and August of that year in the Loch Katrine and Gorbals districts was 50 per cent. less than an average, and from 30 to 40 per cent. less then during the previous minimum years, 1857 and 1865. The Gorbals rain gauges had at that time been established for 21 years, and the Loch Katrine gauges for 16 years. Similar results were obtained at Greenock, where the observations had extended over 35 years. The quantity of water that flowed off the ground at Lock Katrine, and the quantity drawn out of store during this extraordinary draught was carefully worked out from the gaugings which are regularly taken, and the results were, that if 50 million gallons a day had been drawn for the city, in addition to the compensation water, the drought would have lasted from the 10th of March to the 15th of September, a period of 188 days; that there would have been a deficiency of storeage to the extent of 670 million gallons, equal to 9½ inches over the area of Loch Katrine; and that the greatest quantity of water that could have been supplied to the city during the 188 days would have averaged 46,440,000 gallons a day. It has been already stated that, for the purpose of properly maintaining the aqueduct, a discharge of 50 million gallons a day can only be considered equal to a supply to the town of 45 million gallons a day, so that the storeage at the lochs is sufficient to maintain this quantity if it were all available. But the level of the aqueduct at the end next the lock has been so fixed that a discharge of 50 million gallons a day cannot be maintained in the aqueduct if the loch falls lower than 5 feet 10 inches below the top level, or 14 inches short of the full depth authorized to be drawn by the Act. There is, therefore, a deficiency of storeage to that extent at Loch Katrine on the occasion of a drought similar to that of 1869. At the end of such a drought, however, the reservoir at Mugdock might be so nearly full as to enable it to be drawn upon in supplement of the loch, but this cannot be calculated upon. The works, therefore, which appear to be necessary, in addition to those contemplated when the aqueduct was designed, to admit of 50,000,000 gallons a day being passed down to Mugdock, are —first, the raising of the aqueduct bridges; secondly, the making of the aqueduct, where formed by open cutting, water-tight to a height of 12 inches more than it is at present; and thirdly, the raising of Loch Katrine to a height of 14 inches above the present top level. There may not be much difficulty with the raising of the bridges, nor with the raising of the loch, but there will be considerable difficulty in making the aqueduct water-tight higher up while the supply has to be got up to the city. Taking all the circumstances into account, the aqueduct should not be looked upon as capable of passing more than 47 million gallons a day, and if 4 million gallons a day be considered a safe margin for repairs, the available average supply to the city will be 43 million gallons a day, to which has to be added 4 million gallons a day from the Gorbals works—in all 47 million gallons a day." Speaking of the increase in the consumption of water in the past, Mr. Gale says: "The probable increase in the quantity of water required for the city was an important consideration in the designing of the Loch Katrine works at first, and it has been kept in view in their management since their completion. Various estimates were made prior to the introduction of the water, but the largest and most recent is that by Mr. Bateman in February, 1858, in his report on the rearrangement of the piping in the city, which is the last general report he has written on the works. From a consideration of the increase from 1853 to 1857, which was at the rate of 500,000 gallons a day per annum, he assumes that a future increase of 3½ per cent. per annum would be a safe estimate. This rate would make the consumption 26,300,000 gallons in 1872, but the actual average consumption for the first six months of this year has been 32 million gallons a day, or more than 5 million gallons a day in excess of Mr. Bateman's estimate." Mr. Gale annexes a table showing the average actual consumption in each year since the Loch Katrine water was brought in. The increase was, up to 1870, represented very nearly by 1 million gallons a day per annum; but in 1871 there was a sudden increase of 2½ million gallons a day, and in as much of 1872 as has gone, a further increase of 1¼ million gallons a day. As to the probable increase in the future, Mr. Gale "cannot suggest any more likely rate of increase than the continuation of the 5 per cent. per annum. Such a rate of increase cannot, of course, continue for an indefinite period, because it would lead to impossible quantities; but for a period of eight or ten years it may be assumed as representing very nearly the increase that will probably take place, unless some stronger means are taken than have hitherto been adopted to reduce the waste from imperfect taps and other water fittings. If this rate of increase continues, the consumption of water in the end of 1879 will have reached 47 million gallons a day, which we have seen is the whole quantity the Loch Katrine and Gorbals works together can be calculated upon to produce—that is to say, in seven years and a half from this time the existing water-works will be exhausted."

MAJOR BOLTON'S REPORT ON THE METROPOLITAN WATERS FOR THE MONTH ENDING SEPT. 15.

The state of the river at Hampton, Molesey, and Sunbury, where the intake of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth and East London Companies are situated, has been very clear and bright during the month ending August 15. The highest state of the river was 2 feet 4 inches above the 4-feet culvert of the West Middlesex Company (or summer level), and the lowest 1 foot 7 inches.

At Ditton (where the Chelsea Company now alone draws its supply), the state of the river has also been good. The highest state of the water at this place was 8 inches, and the lowest 2 inches above the (6-foot) summer level. The highest temperature of the water at Ditton during the month was 68°, and the lowest 62°, while the highest temperature of the air at the same place was 78°, and the lowest 62°. These observations were uniformly made daily at 9 a.m. The rainfall at Ditton during August was 1·11 inches.

The Lambeth Company having opened the new intake at Molesey, a considerable improvement in the quality of the water supplied by this company is apparent.

The works connected with the construction of a new service reservoir at Streatham, and covering in the existing one, are progressing rapidly.

The Chelsea Company are converting the reservoirs at Ditton into filter-beds as recommended.

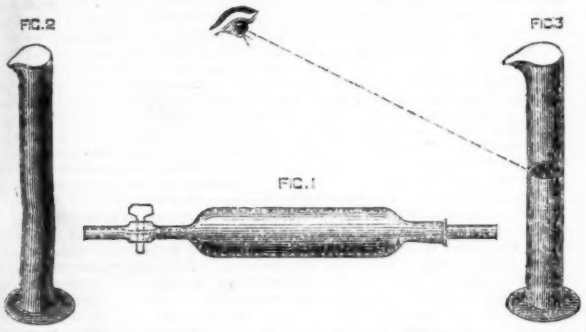
ON THE NESSLER TEST FOR THE DETECTION AND ESTIMATION OF AMMONIA IN COAL GAS.

By WILLIAM FIDDES, F.C.S., Gas-Works, Bristol.

Having had occasion to determine frequently the amount of ammonia in coal gas, I have found the want of some quick and accurate method, which led me to institute a series of experiments upon Nessler's test, with a view of adopting it in such determinations. I have found it all that can be desired, more especially when the amount of ammonia is small. The extreme delicacy of the test renders it necessary to operate upon small quantities of gas, say 1-10th of a cubic foot, and sometimes less; but if care is exercised in the measurement of the gas an accurate result must follow. By this method I have repeatedly made three and four experiments with the same apparatus in the course of an hour, whereas by the old methods it would occupy 24 hours to obtain one result.

Preparation of the Test.—Dissolve, in a flask containing a small quantity of hot distilled water, about 400 grains of iodide of potassium. Place the flask on a sand or water bath, and add a strong solution of bichloride of mercury, occasionally shaking the flask until the precipitate which is formed ceases being dissolved. Allow the red precipitate to subside, and decant the clear liquid; add about 1000 grains of caustic potash in strong solution. Make up to a deci-gallon with distilled water, and add a small quantity of bichloride of mercury solution, say 5 septems. Allow to subside, and decant the clear liquor into a stoppered bottle for use.

To Test for the Presence of Ammonia.—Allow a stream of gas to bubble through a vessel containing distilled water. After the gas has been passing a few seconds, add a measure of the test—say 5 septems—and if ammonia be present, a yellow or brown colouration will be produced. It would be well, in thus testing to treat a similar quantity of the distilled water with a measure of the test, and note the difference in colouration between the two solutions; as it frequently happens in gas-works that the distilled water itself contains traces of ammonia.



In order to use the test for estimating the quantity of ammonia, the following things are requisite:—

1. A gas-meter which gives readings to the 1-100th of a cubic foot.
2. A washing apparatus filled with beads or broken glass, and fitted with stop-cock (fig. 1.)
3. Distilled water free from ammonia.
4. A dilute solution of hydrochloric acid made by adding 10 septems of concentrated acid to one deci-gallon of distilled water.
5. A solution containing a known quantity of ammonia (say 1-1000th of a grain in a septem, which will be found convenient strength), obtained by dissolving 3·147 grains of sal-ammoniac in a deci-gallon of distilled water.
6. A burette graduated into septems to measure the standard ammonia.
7. A pipette, containing about 5 septems, to deliver the test.
8. Several glass cylinders capable of holding, when half filled, about 200 septems (fig. 2).

To Estimate the Ammonia.—Run into the washing apparatus (fig. 1) about 50 septems of acid solution. Connect it with the meter, and pass 1-10th of a cubic foot of gas, measuring the same after its passage through the apparatus. Transfer the acid solution containing the ammonia and the washings from the apparatus to one of the cylinders (fig. 2). Make up to 200 septems with distilled water, and add one measure of the test solution. Observe the colour, and to another cylinder run in from the burette as much standard ammonia as you think will produce a corresponding depth of tint. Make up with water until the volumes in both cylinders are equal, and then add one measure of the test. Allow the liquids to stand a few minutes. Place the cylinders upon a piece of white paper before a window, and observe the colour, which is best done by looking at the surface of the liquid obliquely (fig. 3). If the colouration in both is of equal intensity, the standard solution taken represents the amount of ammonia present in 1-10th of a cubic foot of the gas. If not a different amount of standard ammonia must be run into another cylinder, repeating the same until the colours become equal. It frequently happens that two or three such comparative experiments will be found sufficient.

When sulphuretted hydrogen is present in the gas to be tested, the acid solution, and washings containing the ammonia must be boiled some minutes, in order to expel all traces of sulphuretted hydrogen before applying the test.

PRICE OF COKE AT OLDHAM.—At the meeting of the Gas and Water-Works Committee of Oldham, on the 18th inst., it was resolved to advance the price of coke at the Hollinwood Gas-Works from 10s. to 15s. per ton, in consequence of the demand which has arisen for it. It was stated that the price at which coke had been sold by the Oldham Corporation little over a year since was 1s. 8d. per ton.

GAS SUPPLY OF HULL.—Mr. Baynes reports that the illuminating power of the gas supplied to the Sculcoates and Myton district during August, by the British Gas Company, was equal, on the average, to 14½ candles; the gas exhibited its usual freedom from sulphuretted hydrogen and free ammonia. The results for illuminating power, with Sugg's 15-hole standard burner, and for chemical purity, were:

	Max.	Min.	Mean.
Illuminating power standard sperm candles .	14·78	14·16	14·52
Grains of sulphur per 100 feet	25·70	23·60	24·76
Grains of ammonia per 100 feet	—	—	1·40

Mean barometer and temperature in experiment room:—
Bar. . . 30·17. Temp. . . 67.

GAS SUPPLY OF ARBROATH.—At the meeting of the Town Council of Arbroath, on the 12th inst., the clerk reported that he had received from the auditor, Mr. A. M. Thomson, a statement of the profits arising from the gas for the year. The total sum was £1002 13s. 5d., and the portion falling to the town in terms of the Act was £501 6s. 8d. The Provost said it was satisfactory that there was so much profit to be divided for public purposes, and proposed that £100 be given to the Police Commissioners towards the lighting of the town; and that £150 be paid towards the improvement of Stobcross Bridge, which improvement, however, in consequence of the high price of iron and labour, would not be gone on with just now. The balance of £251 6s. 8d., the Provost proposed, should be devoted to the improvement at the Town Head or North Port. This proposition was unanimously approved of.

FORFAR GAS CORPORATION.—The monthly meeting of this corporation was held on the 4th inst., Provost Whyte in the chair. The only business of importance before the meeting was the offer by two of the shareholders of their shares for sale to the corporation, which, however, the corporation refused to purchase. In connexion with the subject of purchasing shares, the Provost said that there was an erroneous impression abroad among the shareholders that, under the clause compelling the annuitants, if they wish to sell their annuities, to offer them first to the corporation at 22½ years purchase, it was sufficient if they offered them once, and that thereafter they could hold them for any time and sell them when they liked, without again offering them to the corporation. This was wrong, as if they did not sell them within a reasonable period—that being clearly the meaning of the Act—the shares must be again offered to the corporation. It was reported that the additions to, and alterations on the works, were progressing satisfactorily.

THE RISE IN THE PRICE OF GAS AT PEEBLES.—At the annual meeting of the shareholders of the Peebles Gaslight Company, recently held here, it was resolved to raise the price of gas from 5s. 10d. to 8s. 4d. per 1000 cubic feet—being a rise of 2s. 6d. per 1000—for the three months from Nov. 1 to Feb. 1 next. The company assign as their reason for taking this step the high price of gas coal, which has risen about 100 per cent. during the last few months. Such a heavy advance in the price of gas has, as was naturally to be expected, caused a considerable amount of dissatisfaction among consumers; and the Town Council have taken the matter up, with the view of endeavouring to induce the gas company to restrict the advance to 1s. 8d. A committee of the council has been appointed to wait upon the directors of the company for the purpose of conferring with them; and of ascertaining whether it would be practicable to limit the advance as stated.

GAS EXPLOSION AT BACUP.—On Friday, the 6th inst., an explosion of gas took place in a cellar dwelling in Fuller's Terrace, near to the railway station. The house, it appears, had been unoccupied for some time, and had been re-let. On Friday afternoon some women went to light a fire and prepare for removing. No sooner had they struck the match than an explosion, accompanied with a loud report, occurred. The windows were blown out of the house and the door was smashed into pieces. A woman passing the door at the time was struck with a piece of the door, and hurled on to the other side of the street. The women inside the house escaped injury, though a child, with one of them, was slightly injured on the arm. On examination of the premises, it was found that a gas-pipe passes along the coal place, which had become corroded with age, and it is supposed that some person had cut it accidently with a spade when getting in coal, and by this means the gas had accumulated in the cellar.

GAS EXPLOSION AT RETFORD.—On Sunday, the 8th inst., about half-past seven o'clock in the evening, an extraordinary explosion occurred in Retford. The market place is lighted, in addition to the ordinary lamps, by two large pillars called the five lamps and the four lamps, and, at the time indicated, the four lamps was suddenly raised upwards with a loud explosion, and thrown back on the ground. The noise speedily attracted a large crowd, when it was discovered that the heavy pillar had been completely torn up and shattered in its strongest part. Fortunately the pillar was situated at some distance from any of the footways, and consequently no one was injured by it. The explosion caused great alarm in St. Swithin's Church, many of the congregation thinking that the tower was falling in, but the service was not interrupted. Some accounts ascribe the explosion to have been maliciously caused by gunpowder, but there seems to be no doubt that it was the effect of an escape of gas collected in the hollow of the pillar.

THE CLITHEROE GAS COMPANY AND THE CORPORATION.—A special meeting of the Clitheroe Town Council was held on the 12th inst.—the Mayor (Mr. Mitchell) in the chair. The report of the committee appointed to wait upon the gas company at the last meeting of the council relative to the purchase of their works was put in by Alderman Bleakley, and read by the Town-clerk. The effect of it was that the directors were disinclined to sell, and the committee found that if the corporation were bound to purchase at a maximum price, as things now existed, they would have to spend about £24,000 or £25,000. A meeting, however, of the shareholders of the gas company is to be held during the present month. The committee, under the circumstances, recommended the construction of new works. The Town-Clerk stated that he had received a letter from the Surveyor of Carnarvon, who informed him that that town had been placed in a very similar position to Clitheroe with reference to its gas, and that little difficulty had been encountered by the corporation there in putting down new works. On the motion of Mr. Mercer, seconded by Mr. Johnson, the report was ordered to be received and adopted, with only one dissentient, there being a full meeting of the council. It is stated that the public lamps henceforth will be lighted with paraffin.

STREET LIGHTING BY ELECTRICITY.—The authorities of Paris are determined, if possible, to let the light in on the dangerous quarters. With this object in view, a wooden structure has been erected, about 11 feet high, on the south side of the Buttes Montmartre, and on this is to be placed an electric light, which it is hoped will illuminate the streets and wretched alleys of that quarter, and render surveillance more easy than it is at present. This is but an experiment; but, should it succeed, similar lights will be set up in all the dangerous—or, as they are called in Paris phraseology, *executric*—quarters of the city. Similar experiments have been tried over and over again, and always with the same result—namely, that the streets on which the light falls directly are in an intolerable glare, while all the rest are thrown into intense shadow. We see no chance of any different result being arrived at. There are certain outlying, and some very ill-reputed plains, not only around Paris, but other capitals and cities, where electric lights of the kind would be extremely useful, if they were not found too costly for adoption.—*The Architect.*

DISPUTE IN THE GAS-FITTING AND CHANDELIER TRADES.—On Wednesday, Sept. 18, a conference between the employers and workmen in the gas-fitting and chandelier trades at Birmingham was held in the Chamber of Commerce room at the Exchange, with a view to coming to some understanding on the subject of the rate of wages. Mr. H. Heaton presided. The members of the deputation representing the operatives were heard at some length in explanation of the men's claim, which is for a gemeral rise of 15 per cent. irrespective of the prices for work which, it appears, is by no means uniform throughout the trade in Birmingham. The effect of this was pointed out by Mr. Breedon, one of the masters, who said that those masters who paid good prices, as well as those who did not, would have to pay the 15 per cent. extra if the demand of the men were granted. It was ultimately proposed by Mr. W. H. Blews that the question in dispute be referred to arbitration, but, although the masters were all in favour of it, the workmen's deputation declined to accept it. On this decision being ascertained, Mr. Breedon remarked that it was plain the men did not want money; they wanted a lock-out, and on them must rest the responsibility. On Friday evening, a demonstration of the Amalgamated Brass Workers Society was held in the Town-hall to consider the decision of the employers in the engineer and gas-fitting trades. Resolutions were passed pledging the meeting to "fight the 15 per cent. bonus to the death," and, if necessary, to strike to obtain this demand. Letters were received from several employers expressing willingness to concede the bonus, and a resolution thanking those employers was adopted.

WAVERLEY ASSOCIATION OF GAS MANAGERS.—On Wednesday, Sept. 11, the half-yearly meeting of the Waverley Association of Gas Managers was held in the Spread Eagle Hotel, Jedburgh—Mr. Robb, manager of the Haddington Gas-Works, in the chair. There was a full attendance of members, representing the various Border towns. After the meeting was opened, Mr. Robson, secretary, read the report of the financial affairs of the association, which were considered highly satisfactory; after which the chairman, in the course of a few remarks, brought forward the important question of the present rise of coal throughout the country and the effect which it would have both on gas companies and consumers. He solicited the opinion of the members thereupon. The members generally, after a lengthened consideration of the whole circumstances, expressed the opinion that, in the event of the price of coals continuing as at present, the various gas companies in the south of Scotland would be under the necessity of raising the price of gas to meet the present demand. After discussions on various subjects connected with the manufacture and distribution of gas, which lasted for upwards of two hours, the company dined together—Mr. Robb again taking the chair, and Mr. Clazy, Kelso, officiating as croupier. The company enjoyed a most harmonious meeting, in considering the interest both of consumers and gas companies. Mr. Robb was re-elected chairman for the next year; Mr. Clazy, Kelso, vice-chairman; and Mr. Robson, Selkirk, secretary. Mr. Robertson, Berwick-on-Tweed, with his usual cordiality sent a beautiful salmon for the dinner, which was done ample justice to. The company broke up in time for the evening train, all expressing themselves highly gratified with the success of their half-yearly meeting.

MUTUAL GAS CONSUMERS COMPANY IN BUENOS AYRES.—This company in every way promises to be one of the most successful in the River Plate, and the works are already proposed to be nearly doubled in power, so as to be able to light the Boca and Barracas. The site chosen for the fabric is at the bottom end of Calle Defensa, a few squares from the river, so as to be free of flood and easy of access for the coal transit. We think the site a good one for general purposes; it is within easy distance of the Boca Railway and the river; also, being on a main road, there will be no difficulty for coke carts entering at any time of the year. Soon there will be a line of tramway in the whole of Calle Defensa, and the coal can be brought from the river up Calle Defensa, or in a direct line exactly facing the fabric. It is the intention of the company to still further reduce the price to shareholders, and to state the quantity and quality of the gas on each invoice to the consumers; also to use only meters stamped by the English Government, in full accordance with the Government "Sales of Gas Act." The works will contain all the most modern improvements, and each retort is stated to have attached "Morton's patent self-closing lids," which are said to be an immense saving on the present method used in Buenos Ayres, and a great saving to the gas company. The excavations for the works and general buildings will be commenced on Sept. 10, as far as possible, until the arrival of the machinery. The whole of the contract has been entrusted to Messrs. Bower and Co., St. Neot's and London, the same firm who has supplied all the work for the grease, as well as the coal fabric of the Argentine Gas Company. We believe this firm has erected more gas fabrics than any other in Great Britain, and we trust their reputation will be fully borne out in the execution of the works for the Mutual Gas Consumers Company in Buenos Ayres.—*Buenos Ayres Standard.*

EMBEZZLEMENT FROM THE CORK GAS COMPANY.—We learn from the Cork papers that Mr. William Collins, for many years employed by the Cork Gas Company as accountant and confidential clerk, absconded on Saturday week with a large sum of money, variously estimated at from £2000 to £4000. Though Mr. Collins was absent from business on Monday last, no suspicion was aroused, as it was believed at the office and by his family that he had gone on an excursion. On Tuesday, a telegram was received from an English colliery company with whom the gas company had transactions, to the effect that they had not received a draft which they were advised was to have been sent on Saturday. This fact, coupled with the prolonged absence of the accountant, aroused the suspicions of Mr. Lane, the secretary, who, on making inquiries, found that Mr. Collins was not at home, and his friends could give no information of his whereabouts. After the meeting of the directors on Saturday, a cheque for £1100, in favour of the colliery company in England, was handed to Mr. Collins, with instructions to go to the bank and draw a letter of credit for the amount. He was also directed to telegraph to the company that the money would be forwarded by the evening's post. It was found on inquiry at the bank on Tuesday that the letter of credit had not been passed, but that the cheque had been cashed by Mr. Collins for gold and bank-notes. Other cheques have now been found to be missing, and the total amount of deficiency is estimated at £2800. There is a further sum of £1200 reported to have been raised on shares which the accountant held for the company in one of the local railways, and it is to be feared that further investigation will reveal defalcations to a much greater extent. The affair was deliberately planned, and carefully carried out. The fact that three days should have elapsed before the embezzlement was even suspected, indicates the tact and ability which were used in the execution of the design. On the Saturday evening Collins went to a jeweller's in Patrick Street, and selected a handsome gold lever watch value £25, which he said was to be placed to his account. The fugitive left Cork by the 10.10 p.m. train on Saturday for Dublin, and has since been traced across the Channel. Up to a late hour last night no information had reached Cork as to his whereabouts. Mr. Collins was a married man, and in receipt of a salary of over £200 a year. He was a steady and active business man, and had possessed the fullest confidence of the directors. We are informed that the directors of the company have engaged the services of Mr. R. H. Jones, of Dover, to investigate their accounts and to rearrange the books which were lately under the charge of Mr. Collins.

PUBLIC LIGHTING AT BOSTON.—A special meeting of the Boston Local Board was held on Monday, Sept. 9, to consider a resolution of the directors of the gas company touching the lighting of the public lamps—Alderman Clegg in the chair. The clerk read the resolution forwarded by the gas company thereon, which was as follows:—"That the Boston Gaslight and Coke Company are prepared to supply gas to the public lamps at the same rate as charged to private consumers, from the 1st day of July last; and that, in the event of no further reply being received from the local board, assenting either to these terms, or to the terms as proposed in the resolution of the directors, dated the 12th of August last, the supply of gas to the public lamps will be suspended on and after the 15th of September inst., without further notice." Mr. Morton said the demand made a week ago by the directors was £4 10s. per lamp, and it was shown by one of the board that a private lamp, lighted and put out at the same time as the public lamps, cost only 54s. last year. This being the case, there was no valid ground for the directors asking an advance on the old contract of £3 5s. per lamp. Mr. Storr said the Great Northern Company had been served with notice of an increase of charge; instead of 3s. 4d., they would have to pay 3s. 9d. in future. Mr. Maltby said he had received a letter from Lincoln stating that the local board there paid 3s. 4d. per 1000 feet, the same as the rest of the consumers, burned 4 feet per hour, lighted 10 months in the year, and paid 8s. 4d. per lamp for lighting, cleaning, &c., to another party. Mr. Storr said that at Peterborough and Stamford the gas companies supplied the public lamps at 4s. per 1000 feet, and charged 15s. a lamp for lighting, cleaning, and repairing. Mr. Wheeler said the number of hours the lamps were lighted last year was 3381, with an average consumption of 5 feet per lamp per hour. If they reckoned each lamp at £3 8s., and added 10s. for cleaning, &c., it would make £3 18s., but, by reducing the hours of lighting to 3000, which might easily be done, the charge of the whole would be reduced to £3 10s. per lamp, burning 5 feet per lamp per hour. Mr. Morton designated the demand of the directors as extortionate, and said he was satisfied the town would cheerfully submit to darkness rather than pay the sum asked for. Mr. Maltby said he was of the same opinion; but it was absurd to talk about turning the gas off. The board could obtain an injunction to prevent such a course. Mr. Kenington thought the rise in the price of coals, wages, &c., justified the directors asking for some advance, but, although a shareholder in the company, he could not approve of the sum asked for. Mr. Bailes said the company was now charging 4s. per 1000 to the tradesmen of the town, and their own Act of Parliament expressly declared that they should supply the local board at the lowest rate charged to private consumers. They were now supplying the Great Northern Railway Company at a lower rate than 4s. per 1000, and therefore they had no legal right to ask or expect the local board to pay at the rate of 4s. Mr. Wright thought the only difficulty in the way lay in the fact that the Great Northern Railway Company found their own mains. The question was whether the railway company was not entitled to some consideration on that account, which would put it beyond the right of the local board to demand that the gas be charged to them at the same rate. He for one would stick up for the right of the board in the matter; and he thought it their duty to obtain their gas at as low a rate as the Act of Parliament would allow Mr. Wheeler said that, calculating the price at 4s. per 1000 feet, and taking the scale of lighting he had previously given, the price per lamp would be £3 8s. Add to this 10s. for cleaning, &c., and they would have a total of £3 18s., but if they reduced the hours of lighting to 3000 they would get the whole done for £3 10s. per lamp. Mr. Morton and Mr. Swinn observed that there was not a word mentioned in the directors resolution about lighting and cleaning of lamps. After some further discussion, it was proposed that the matter be referred to a committee for the purpose of obtaining more definite terms from the company. As an amendment to this, Mr. Wright moved—"That the local board is prepared to pay per meter the same price for gas as is now paid by the Great Northern Railway Company for one year, from the 1st of July last, and also to pay at the rate of 10s. each lamp for the management and repairs thereof for the same time, or to take that management in their own hands." Mr. Best seconded the amendment, which was carried. Another special meeting of the board was held on Tuesday, the 20th inst., for the purpose of receiving the following reply of the gas company to the resolution of the local board, passed at the meeting held on the 9th inst.:—"Resolved that the directors propose to light the public lamps for one year, from the 1st of July last, at the sum of £4 5s. for each lamp, to include lighting and extinguishing, and cleaning and repairing the gas lanterns; and that the clause in the resolution of the 3rd of September, as to discontinuing the lighting of the public lamps, in the event of an agreement not being arrived at with the local board, be suspended until the 24th of September inst." Instead, however, of laying this resolution before the committee, the clerk opened the proceedings by reading a letter which had reached him in the course of the day from the clerk to the gas company, in which it was stated: "The directors are now willing to continue the lighting of the public lamps under the terms of the old contract from the 1st of July last to the 31st of December next, after which date a general rise in the price of gas to all consumers will become necessary." After some discussion, Mr. Swinn moved that the offer of the gas company be accepted. Alderman Bailes thought the new offer a very liberal one, and, as it removed all difference between the board and directors, was worthy of acceptance. Mr. Maltby saw nothing liberal in it. It was not only most unusual, but would be found very inconvenient to have a contract terminate in mid-winter. Mr. Swinn, taking Mr. Baile's view of the offer, proposed that it be accepted. Mr. Radley, in seconding the proposition, expressed his approval of the liberal spirit it evinced, and his belief that when the time came for considering the new contract, a spirit equally liberal would characterize the proposal of the directors. Alderman Wright, in announcing his intention of supporting the resolution, reminded Mr. Maltby that the board had won a moral victory, and advised him not to mar it by seeking to extort what he might consider better terms. Mr. Bedford said that the new terms before them were certainly much better than any which had preceded them. He had hoped, however, that the old contract would be continued until next July. The concession made by the directors clearly showed that they had been brought to see that the town would put up with total darkness rather than submit to the demands they made a week ago. The proposition was then put, and carried *nem. con.*

THE PRICE OF COAL.—Gas coals in Newcastle have gone up from 6s. 8d. to 26s. per ton, and the company which lights that town must either get permission of Parliament to increase its rates for gas, or forego its dividends, and make a further present to the inhabitants of £20,000 or £30,000 a year.—*Daily News.*

THE SEWAGE DIFFICULTY.—It is announced that the local authorities of West Ham have determined to erect works to test on a large scale the mode of clarifying sewage, and utilizing the sludge resulting from the process which has been proposed by Major-General H. D. Scott. The Town Council of Birmingham, at their monthly meeting on the 3rd inst., likewise adopted, by a majority of 24 against 1, a resolution to erect works of sufficient magnitude at Saltley, for the purpose of carrying out an experimental trial of General Scott's process, at a cost of about £1000. The plan of General Scott consists in clarifying sewage by means of lime, and converting the sediment into cement or agricultural lime, which is stated to be rich in phosphoric acid, by calcining it with the fuel which the sludge of the sewage supplies. It is proposed to prepare at Birmingham ten tons of that cement weekly.

THE LIVERPOOL WATER SUPPLY.—The quantity of water stored in the Liverpool reservoirs is now 1095 million gallons more than at the corresponding period of last year. There was an increase of 52 million gallons for the fortnight ending the 3rd inst.

THE SHEFFIELD CORPORATION AND THEIR PARLIAMENTARY COSTS.—The bill of costs for which the Sheffield Corporation are liable by their parliamentary campaigns amounts to over £14,000. The water company obtained an injunction prohibiting payment out of the borough fund, and a voluntary rate of 6d. in the pound was therefore asked from the ratepayers. The result has been £1786 11s. 10d., after two months have elapsed. Many ratepayers, however, will yet pay their little bills.

WATER SUPPLY OF STAMFORD.—The Corporation Water Supply Committee met at the Town-hall on the 12th inst., to receive from Mr. Sanderson, the agent of the Marquis of Exeter, a report of the water resources at Wothorpe and at Easton. Mr. Sanderson stated that the existing supply at Wothorpe is 70 gallons per minute, or 100,000 gallons daily, which gives 12½ gallons daily for each person according to the present population. It was proposed to tap fresh springs and increase the quantity at Wothorpe to 85 gallons per minute, or 121,600 gallons daily. This, he estimated, would be amply sufficient for the lower parts of the town. For the higher parts it was proposed to construct a reservoir at Easton, which would be 160 feet higher than the level of Stamford bridge, and into this would fall two springs yielding together 65,800 gallons daily, giving a total of 186,400 gallons per diem, or 18½ gallons per day for each person in a population of 10,000, and over 20 gallons a day for each person according to the present population. The committee thought that if Mr. Sanderson's estimate of the quantity could be realized the supply would be sufficient, and Mr. Sanderson undertook, if terms could be made with the council, to commence forthwith the necessary works for conveying water to every part of the town.

GRANTHAM WATER-WORKS COMPANY.—An extraordinary general meeting of the shareholders in the water-works company was held at the Guildhall on

Friday, Sept. 6, for the purpose of taking into consideration the propriety of making an application to Parliament for leave to bring in a bill to incorporate the above company, and to obtain greater powers for enabling the company more efficiently to carry on their undertaking; and also for the purpose of taking into consideration the propriety of increasing the capital of the company. Mr. L. Ridge, chairman of the company, presided, and there was a large attendance of shareholders. Mr. J. G. Thompson read a lengthy report of the directors, which detailed the progress of the company since its formation in 1850 up to the present time, and recommended the company to apply to Parliament to increase the capital from £9000 to £20,000. The Chairman remarked that those who had been acquainted with the company from its earliest formation would know that they had only 500 shareholders and a capital of £5000 to begin with. The amount gradually increased during the first five years until it reached £8000, and in the second five years £11,000, then 13,800, and now it was £20,000. The rental had increased from £203 to £1837. He moved that the report of the directors be approved and adopted, and that the directors be empowered to make an application to Parliament for leave to bring in a bill to incorporate the company. Alderman Boyall seconded the resolution, which was carried unanimously. Alderman Gamble moved a resolution authorizing an increase of the shares, which was also carried unanimously.

CHARGE OF DEFRAUDING THE NOTTINGHAM WATER-WORKS COMPANY.—On Monday Sept. 16, Robert Lund, a publican, carrying on business in Castle Gate, Nottingham, was summoned at the Town-hall, before the Mayor and Mr. Thackeray, charged with a fraud on the Water-Works Company, through having used a quantity of water that had not passed through the meter. Mr. Everall was for the prosecution, and Mr. Belk defended. An officer in the employ of the company stated that about a quarter to one o'clock on the morning of the 4th of September he went to the defendant's place and found water running into the brew-house. Mr. Lund was supplied by meter, but the pipe from which the water was running into the brew-house was attached to the main. The water was being used to cool the liquor, and it ought to have gone through the meter so that an account of it might be kept. He pointed the matter out, and went away, but, on returning at six o'clock, he saw the water was still running as before. He told the defendant he was using the company's water without paying for it, and defendant replied that he could cool his liquor better in that way than when it went through the meter, and he intended to have it altered. Mr. Belk: Did he say he had been obliged to tap the main, as it came so slowly through the meter? Witness: No. Joseph Ingham, another of the company's servants, said he tested the meter, and found it in good working order. About 100 gallons per hour would pass through the pipe the defendant was using. Mr. Belk said his client did not pretend to assert that he did not take the water, but he was somewhat anxious to explain the circumstances under which it was used. Defendant brewed on his own premises, and as he found he could not cool his liquor owing to the small quantity of water that went through the meter, he was tempted, on the spur of the moment, to tap the main, in order to procure a greater supply. Time did not permit it, or he would have given the necessary notice to the company to make the alteration. The company had not sustained much damage, but at the same time it was desirable the public should know they had no right to tamper with these pipes. Defendant regretted the circumstance should have taken place, and wished to assure the bench he did not desire to defraud the company at all. The bench fined the defendant £5.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

2576.—GEORGE SPENCER, of 77, Cannon Street, London, civil engineer, for "*Improvements in the purification of coal gas used for illuminating purposes, and for mechanical purposes.*" A communication. Aug. 30, 1872.

2577.—CATHERINE JUDKINS, of 11, Park Terrace, Brixton, in the co. of Surrey, gas-regulator manufacturer, for "*Improvements in wet and dry gas-regulators.*" Aug. 30, 1872.

2587.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*Improvements in electric apparatus for lighting gas and other burners.*" A communication. Aug. 30, 1872.

2592.—WILLIAM HENRY SAMUEL, of the firm of Samuel and Pearce, of Liverpool, in the co. of Lancaster, merchant, for "*Improvements in apparatus for lighting gas by electricity.*" A communication. Aug. 31, 1872.

2599.—JOB EDWARDS, of Wednesbury, in the co. of Stafford, manufacturer, for "*Improvements in the manufacture of wrought-iron fittings or junction pieces for gas, steam, and water pipes.*" Sept. 2, 1872.

2602.—SAMUEL JOSEPH WOODHOUSE, of Holbeck, Leeds, in the co. of York, gas engineer, for "*An improved apparatus for purifying and regulating the supply of gas to burners; also an improved construction of burner and standard tap to be used therewith, and for other purposes.*" Sept. 2, 1872.

2622.—ROBERT MAY CAFFALL, of Alton, in the co. of Hants, for "*Improvements in earth-closets, and in arrangements of mechanism for receiving and spreading the earth therein, and for hermetically closing the openings, such mechanism or part thereof being applicable to other forms or make of earth-closets.*" Sept. 3, 1872.

2624.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in water-closets.*" A communication. Sept. 4, 1872.

2630.—JAMES WILLIAM POLLARD, of 9, Mincing Lane, merchant, JOHN SCHOFIELD, of 37, Mark Lane, merchant, and ALEXANDER BUTEL, of 25, Merchant Street, Bow, manufacturing chemist, all in the co. of Middlesex, for "*Improvements in the treatment of spent oxides of iron for the purpose of extracting cyanides.*" Sept. 4, 1872.

2643.—JOHN SHANKS, of Barrhead, in the co. of Renfrew, N.B., sanitary engineer, for "*Improvements in water-closets and in taps or valves for the same, and for water supply-pipes.*" Sept. 5, 1872.

2683.—MILLINGTON HENRY SYNGE, of the United Service Club, Pall Mall, in the co. of Middlesex, colonel Royal Engineers, for "*Improvements in deodorizing apparatus.*" Sept. 10, 1872.

2711.—WILLIAM DENNY RUCK, of Greenwich, in the co. of Kent, for "*Improvements in the manufacture of gas.*" Sept. 12, 1872.

2779.—ALEXANDER COLVIN FRASER, of 41, Clarence Road, Finsbury Park, London, civil engineer, for "*Improvements applicable to retorts for the manufacture of gas.*" Sept. 19, 1872.

GRANTS OF PROVISIONAL PROTECTION.

1421.—JAMES ROBEY, of the city of Manchester, sugar refiner, for "*A new or improved filtering medium, suitable also as a disinfectant and deodorizer.*" May 10, 1872.

1656.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, for "*Improvements in metallic packing for making steam, air, gas, and water-tight joints.*" May 31, 1872.

2362.—SAUL MYERS, of Vale Terrace, Sutherland Gardens, Maida Vale, London, in the co. of Middlesex, for "*Improvements in gas-lighting apparatus.*" A communication. Aug. 8, 1872.

2460.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*Improved apparatus for automatically igniting gas.*" A communication. Aug. 19, 1872.

2496.—MILLINGTON HENRY SYNGE, of the United Service Club, Pall Mall, in the co. of Middlesex, colonel Royal Engineers, for "*Improvements in deodorizing apparatus.*" Aug. 22, 1872.

2504.—WILLIAM MORRIS, of the Kent Water-Works, Deptford, in the co. of Kent, engineer, for "*Improvements in making connexions with water-mains under pressure.*" Aug. 23, 1872.

2510.—WILLIAM VINCENT, of Arborfield, in the co. of Berks, machinist, for "*Improvements in apparatus for manufacturing gas.*" Aug. 23, 1872.

2514.—HENRY ALDER, of Edinburgh, N.B., for "*Improvements in the construction of dry meters.*" Aug. 24, 1872.

2528.—JOHN FREDERICK PARKER, of Birmingham, in the co. of Warwick, chemist, and ARTHUR WADE, of Birmingham aforesaid, stockbroker, for "*Improvements in the manufacture from coal and petroleum of hydrocarbon gas, or gas for illuminating and heating.*" Aug. 26, 1872.

2538.—HENRY YOUNG DARRACOTT SCOTT, of Ealing, in the co. of Middlesex, major-general, C.B., for "*Improvements in the treatment of sewage, and in the preparation of manures therefrom.*" Aug. 26, 1872.

2542.—WILLIAM WILLIAMS BOX, of the Crayford Gas-Works, in the co. of Kent, for "*Improvements in apparatus used in the manufacture of gas.*" Aug. 27, 1872.

2569.—BALTHASAR WILHELM GERLAND, Ph.D., of Macclesfield, in the co. of Chester, consulting chemist, and EDWARD JOHNSON, of Belle Vue Lodge, Dartmouth Park, near Sydenham, in the co. of Kent, for "*Improvements in the manufacture of sanitary charcoal and the application thereof to the treatment of sewage.*" Aug. 29, 1872.

2577.—CATHERINE JUDKINS, of 11, Park Terrace, Brixton, in the co. of Surrey, gas-regulator manufacturer, for "*Improvements in wet and dry gas-regulators.*" Aug. 30, 1872.

2587.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*Improvements in electrical apparatus for lighting gas and other burners.*" Aug. 30, 1872.

NOTICES TO PROCEED.

1234.—LEWIS WILLIAM PRITCHARD, of the Western Gas-Works, Kensal Green, in the co. of Middlesex, engineer, for "*Improvements in valves.*" April 25, 1872.

1262.—JOHN CHADDERTON, JOSEPH ALLMARK, and BENJAMIN HAIGH, of the Alma Bridge Works, Dukinfield, in the co. of Chester, engineers, for "*Improvements in cocks and water-gauges.*" April 27, 1872.

1326.—EDWARD CRADDOCK, of 3, Fowkes Buildings, Tower Street, in the City of London, engineer, for "*Improvements in the manufacture of pipe-wrenches.*" May 2, 1872.

1352.—HENRY EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*An improved composition to be used for the manufacture of drain-pipes and other articles, and as a substitute for artificial stone.*" A communication. May 3, 1872.

1355.—WILLIAM BROOKES, of 62, Chancery Lane, in the co. of Middlesex, patent and registration agent, for "*Improvements in means for communicating motion and pressure to parts of presses, cocks and valves, vices and jacks, which improvements are also applicable in communicating motion and pressure to parts of other apparatus.*" A communication. May 4, 1872.

1359.—GEORGE HAYES CARTER, of Mottingham Lodge, near Eltham, in the co. of Kent, for "*Improvements in the construction of gas-stoves applicable for heating public and private buildings, pineries, hothouses, graperies, and such like buildings and purposes.*" May 4, 1872.

1414.—WILLIAM ROSS, of Glasgow, in the co. of Lanark, N.B., brassfounder, for "*Improvements in water-closets.*" May 9, 1872.

1438.—FREDERICK PHILIP PRESTON, JOHN THEODORE PRESTIGE, EDWIN JAMES PRESTON, and WILLIAM ALFRED PRESTIGE, trading under the firm of Josiah Stone and Co., of High Street, Deptford, in the co. of Kent, engineers, for "*Improvements in apparatus for regulating the supply of water to water-closets and other places.*" May 11, 1872.

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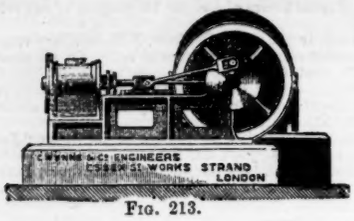

FIG. 213.

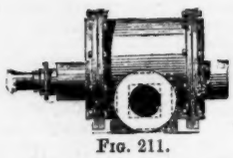
FIG. 211.

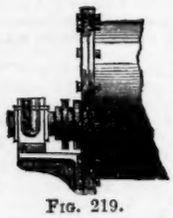
FIG. 219.

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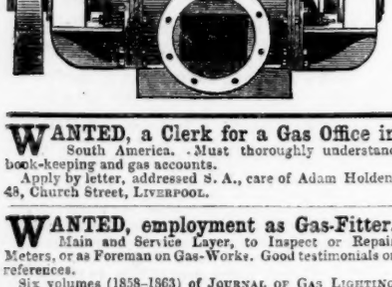

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

Edinburgh and District Water-Works.—*The demands upon our space this week compel us to postpone the publication of Messrs. Hawksley and Leslie's elaborate reports to the trustees on the several questions remitted to them. The reports are in type, and will appear in our next number.*

B. P. S.—*Received, but too late for insertion.*

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, OCTOBER 8, 1872.

Notes upon Passing Events.

The retirement of Lord Chancellor Hatherley, at a time of life when most men consider that leisure is their due, and the succession of Sir Roundell Palmer, promise something real in law reform—some solid, certain advance in the pathway which Lord Brougham first boldly trod. Sir Roundell Palmer's reputation is so high as a man and a lawyer that it is only as a legislator that he can increase his reputation in these quiet times. No man of the world believes that, in this expensive country, litigation, where great pecuniary interests are involved, can be made absolutely cheap. Time is of value to witnesses, and professional men of reputation charge for that reputation as well as for their time; and they will continue to do so until the Nationalists establish Utopia in a universal dead level of labourers, lighted up by the paid functionaries who will act as foremen in every department. But law reform is open to competent reformers in two clear directions: a further advance in the certainty and simplification of processes on the lines commenced when county courts were established—in the reduction of existing laws to a more manageable form, either by digest or by codification, so that at any rate Acts of Parliament shall no longer be contradictory, and the truth have to be sought in a labyrinth of print. Next and equally important is the simplification of the laws affecting the transfer of land—a reform which will be supported by a large class which has no sympathy with the schemes of Mr. Peter Taylor, Sir Charles Dilke, and the levellers who would put down all the squires and territorial magnates, in order to replace them by prefects, sub-prefects, policemen, and national rent-collectors in or out of uniform. A cheap system of conveyancing will not make land cheaper; on the contrary, it is more likely to make it dearer, and it will not reconcile well-paid mechanics to the inevitable privations and hardships of a peasant proprietorship. A system of small farms in the present day is about as probable as a return to hand-loom weaving, but facilities for purchasing and borrowing on the security of land will attract a considerable amount of capital held by the most enterprising class of small capitalists. In land-law reform the new Lord Chancellor and his associates in the Cabinet have "fresh fields and pastures new" for reform more likely to yield sweet fruit than the wild schemes of fanatics and Utopian Positivists, for which the unpoetical work-a-day world is by no means prepared.

If the French ever learned anything from experience, they would find a useful lesson in the amusing account which M. About has been publishing of his imprisonment and examinations before a German magistrate. To us Englishmen there is something shocking in the idea of a man being arrested for an offence alleged to have been committed in another country—in his being put in solitary confinement, and subjected to a rigorous cross-examination with the view of obtaining evidence on which to convict him. But it must be remembered that this system of imprisonment and secret cross-examination of the prisoner is not exclusively German; it is continental, and especially French. Any time within the last twenty years it has been as common as possible for both Frenchmen and foreigners to be arrested without any warrant in the streets of Paris by an inferior police agent; to be confined, either alone or in company with the vilest malefactors, for forty-eight and sixty-four hours, on a scanty supply of disgusting food; to be bandied backwards and forwards from prison to prison, examined and cross-examined, allowed no communication with friends or legal advisers, although the slightest proper inquiry would have proved the innocence of the prisoner; and finally, after days and nights of hardship, insult, and mental torture, he has been unceremoniously dismissed from prison without apology or redress of any kind, or expelled at the frontier under charge of a policeman.

The Welsh are a curious people whom it is impossible to understand from either English or Irish precedents. They have great merits and most offensive defects. They have enthusiasm, which induces them to erect many chapels; they have frugality, which enables the humblest and more unlikely people to save money, build houses, and buy land. They have the idea of credit, and lend each other savings at five per cent., instead of hiding it in holes as the French and Irish do. They are bitter enemies, but not bloodthirsty—you rarely hear of a Welshman killing any one except in a drunken quarrel. Verbally they hate the Saxon intruder, and show their hatred by selling everything as dear, and buying everything from him as cheap, as possible; but they never shoot him. Their clannish feeling is so strong that the gentry, including parsons of pure Welsh descent, join in their cups in cursing the Saxon. They are all born with a taste for poetry, but did any one ever see, in any rank of life, a Welsh gentleman? Ladies of fashion, who have lived and even married in Wales, say not. In some points the Welsh are quick to take advantage of changed times. They alter their cottages, and even build villas, to make preparations for a sea-bathing season, on every railway line. On the other side, drunkenness is a prevailing vice, in which the large earnings of a summer tourist or bathing season are wasted. Untruthfulness is as common as mendacity, and considered as venial in all dealings with the Saxon as if the Welsh had been slaves for centuries. In public matters, such

as the business of vestries and boards of guardians, jobbery comes as naturally to the Welsh peasant as if he were a common councilman in an ancient corporation. The favourite crime of an Irishman is homicide; the preference of the Welshman is for forgery; mostly practised in the shape of the notes of hand or codicils of some dead man. A speech of Mr. John Jones, one of the members for Carmarthenshire, at an agricultural meeting, is singularly characteristic of the Welshman *pur sang*. He considered that "The Public Health Bill—except as regarded urban "districts, where legislation was absolutely necessary—was un-"called for and unsatisfactory. Just fancy an inspector coming "poking his nose into every hole and corner of the rural districts. "Why, under such a system, every house in the country would "be censured and condemned." Mr. Jones never said a truer word—that is, if Welsh inspectors can be found to do their duty toward Welsh householders, with the English he will be strict enough. The Holyhead line is not very far, and very accessible from the county Mr. Jones represents. Along that line, at every station, a crop of inns and lodging-houses have sprung up to accommodate the shoals of visitors from the manufacturing districts. Merchants and manufacturers from Lancashire and Cheshire have also built, on the many picturesque sites that abound, charming villas. Lovely scenery, pure air, and purling streams from the adjoining hills are real attractions. As long as only peasants lodged in cottages, the excreta of each family went to enrich the garden or died away unnoticed. But a great summer population, the modern, and in such situations mischievous, fashion of water-closets, no efficient system of drainage, overflowing cesspools, and too ample a supply of water, have produced their natural results. At every sea-side season typhoid and scarlet fever fester in the most beautiful little villages. Bangor has a local government; Llandudno was sewered and drained under the plans of a competent engineer many years ago, and will remain healthy until Welsh economy succeeds in poisoning Cardigan Bay—a piece of extraordinary cheeseparing folly, because several sandy tracts of rabbit warrens lie conveniently near for filtration and the growth of much needed market gardens. But in dozens of miniature watering-places of Wales, with unpronounceable names—at least unpronounceable by any English tongue—death lurks under thatched roofs festooned with roses and creeping plants. In these villages Mr. Jones's patriotic advice will be taken to heart—the inspector of nuisances will be cursed as an unpatriotic and degenerate Cymri. Mr. Jones also appealed to the warmest sympathies of his countrymen when he called the Licensing Bill "tyrannical and unprin-"cipled." It is not the fault of this thirsty and convivial M.P. if the police do not meet with rioters when they prepare to close public-houses just when the harp and dance are in full swing, or the bard is reciting the triumphs of the Cymri over the stupid Saxon. "He was perfectly astonished to see the unanimity with "which the public accepted it—at least he would not use the word "unanimity, but he would say the good nature with which they "submitted to its regulations. He ventured to predict that when "it was put into full operation, and people were turned out of "public-houses at the very hours which they had to devote to "enjoyment, they would not be long before rebelling against its "provisions."

From other parts of the country come very different opinions. In Liverpool, at the request of the working men of several factories, beer and spirits are no longer to be sold retail until after seven o'clock in the morning. From Kent, where the very scum of London congregate during hop-picking, come reports that never has the season passed off with so little drunkenness or rioting; the magistrates business has been a sinecure. From every part of the country the same accounts—more order, fewer police cases. In London, at a meeting of aggrieved publicans, the editor of the organ advocating unlimited facilities for drinking stated that the "theatrical profession and others connected with "the theatres were forming clubs—a measure likely to be very "injurious to the trade;" and, we may safely say, very advantageous to the members of the clubs. It is in association that people with fixed and limited incomes can find compensation for the high prices of necessaries as well as luxuries. Clubs are a luxury to the higher classes; to lower middle classes and working classes, now compelled to live out of town, they may become a substantial source of economy.

Mr. Lowe's triumphant progress through Scotland in the character of a professor of political economy, cynical yet good-humoured, has afforded fine texts for leading articles at a dull season. The Liberal papers of advanced views admire his opinions in the abstract immensely, but then they all object to the application to their own pet schemes, although they entirely approve of them when directed against Conservative speeches. For instance, they quite agree with the Chancellor of the Exchequer, as every man of common sense must, that, because the country is rich, the revenue flourishing, paupers and criminals diminishing, there is no reason why we should pay artisans and labourers at Woolwich, Portsmouth, Plymouth, or Pembroke, whom we do not require, in order that these workmen may have wages, and the tradesmen of those towns the benefit of their expenditure. Political opponents and professional friends of the working men make capital out of the unpopularity of the economy which closes factories not wanted. Mr. Lowe, with characteristic courage, showed that nothing could be pleasanter for a minister who only lived for the day than to spend the money of taxpayers in making large presents to pertinacious applicants. This was the system of the French Imperial Government, and it made things very pleasant as long as it lasted. Paris was for a time delighted with a liberal expenditure in public works, which employed a class which had always made revolutions. In the provinces, the towns and districts which were noisily loyal to the Imperial Government were rewarded—the poor fools never dreamt that they themselves found, or would have to find, in taxes, the money that was lavishly bestowed on them in the shape of town-halls, theatres, public galleries, gardens, prefectorial balls and banquets—until the bubble burst. We have apostles of the same kind of folly here—one calls for dockyard work as if they were to be national workshops. Another proposes to give a free passage to a colony and a purse to every family that declares itself destitute; a third would open public works at good wages to employ those who preferred not to emigrate. Against such doctrines Mr. Lowe sets his face in set speeches; not before it was time, when such a man as Sir John Pakington had begun to flirt with that sentimental socialist, Mr. Scott Russell. But Mr. Lowe was not happy in the illustrations of his stern practice of national economy. The management of Epping Forest and the New Forest cannot both be right, because they are managed on opposite principles. If the Woods and Forests had something to sell to the villa residents of Epping Forest, they were certainly in a position to make a bargain for the benefit of the nation. In the New Forest the residents are persecuted by the enforcement of old forestal laws; in the Epping Forest they once sold privileges which Mr. Lowe now proposes to abandon for nothing; but this was not the worst blunder of the Government. With a certain spitefulness that smells very much of the First Commissioner of Works, when their own petty scheme for saving a few acres of Epping Forest was defeated, they threw every impediment in the way of the Corporation of London, which was prepared to do something on a really liberal scale for securing the greatest playgrounds of the metropolis. The allusion to the Embankment, where the Government seemed and seems determined to defy the House of Commons, was only suited to the ignorance of the Glasgow audience. The ratepayers of London have created four acres of solid ground out of two acres of stinking mud, and they ask to enjoy it on the same terms as the Crown tenants of Whitehall can. This, Mr. Lowe, with strange perverseness, calls robbing the nation of £40,000. So do the gold miners of Australia rob the Imperial and Colonial Government of the nuggets picked up and turned into cash for their own private use. But when Mr. Lowe lays it down that the business of Government is to govern and not to do anything that private enterprise would do as well, he returns not only to sound political economy, but to the sound and safe principles of the British constitution. The *Echo* and the *Daily News*, to whom the word "railway" has the effect of a red rag on a bull, think differently, and protest because Mr. Lowe is not prepared to add to the difficulties of the naval building yards the management of some score factories for repairing and building locomotives; to call on the eminent military men who have made such a mess of the Woolwich guns to supersede our civil engineers; to add to the difficulties connected with employing and discharging shipbuilders all the army of lately discontented railway men; to hand over to Mr. Gore, of the Woods and Forests, to Mr. Ayrton, of the Board of Works, or their fellows, the power of blundering and of insulting every passenger and every sender of merchandise on English lines. Because the metropolitan finances have been not nearly so badly managed as an officially managed bank at Bombay, the *Echo* proposes to hand it over to the Post-Office, whose only difficult work is done by railway companies. Does any one believe that the War Department, or the Admiralty, or the Woods and Forests, or the Board of Works, or the Post-Office, which resisted the use of railways as long as possible, could or would have made the Underground railways? The idea is absurd. But if Government is to take the railways, why not their feeders, the steamboats, the omnibuses, and the cabs of the country? Why not clothe the nation from Pimlico, and feed them from stores as they now feed the army and navy—that is on very tough beef, wholesome, perhaps, but very hard?

The agricultural labourer is the standing dish of every agricultural meeting and newspaper. He crops up in the most unexpected places, like that irrepressible nigger of whom we were delivered by the great Confederate rebellion. If good advice could benefit the rural labourer, he would indeed be a happy man. Peers

spiritual and temporal, broad-acred baronets and squires who represent the opinions of a whole county, talk to him just as benevolent parsons talk to charity children. The old tune is the same, although time has somewhat changed the words of the labourer's hymn:

May we listen to the parson,
Keep from poaching and from arson,
Bless the squire and his relations,
And keep us in our proper stations.

Colonel Lloyd Lindsay is known in the House of Commons as a most dreary speaker, listened to by enough members to save a count out, because he bears on his gallant breast the Victoria Cross, and is married to the amiable daughter of a sevenfold millionaire—a father-in-law who understands perfectly that the only way to make land pay its best is to make it fit to receive the farmer's capital, and provide every farm with cottages in which a race of healthy labourers can be retained and reared, and yet what sad stuff the colonel delivers to his constituents. The colonel does not like education; that is natural, as he was bred in the theory that men of his class could rise to the highest military honours without much more education than the capability of reading and signing a regimental order-book. "Education," he says, "will never put "an ounce of mother wit into a man's head." A truism. You will never be able to pump water out of a dry well, but pumps are useful for all that. The Colonel is only the echo of extinct and powerless prejudice. He then complains that those who call the agricultural labourer a chronic pauper do not take into account his privileges and perquisites in addition to his wages. In these he counts "gleaning and stubbling," permission for wives and children to take what is left when the last rake has gone over the farmer's last field, Also "harvest wages"—that is, extra pay for extra work during a time that the demand is, at least, as great as the supply. The colonel "regrets to find that increased wages and large earn-"ings do not bring with them an improved condition of the "labourer." Why, that is nothing peculiar to the agricultural labourer. How often has it been remarked that the jolly captain

Who lived on his pay,
And spent half-a-crown out of sixpence a day,

became a dry, cold, reserved, and haughty personage after marrying an heiress. It must be remembered that Hodge, whose mental powers have not been debauched by the education which the colonel so much deprecates, is only an animal, and can see in increased wages the result not of agitation but demand nothing so well worth having as more beef and more beer. Give him a garden, a pigstie, an allotment, and a cow's grass and he will find out the value of savings unknown to him who now looks on the workhouse as his certain haven from toil in old age.

The *Daily News* advocate of a party which hopes for Utopia in the abolition of squires and peers, and the conversion of rural England into a congeries of peasant farms, has been napping this vacation, and publishing an account of what may be expected when the magnates of the land consist of Government functionaries and capitalist manufacturers. A special commissioner has been investigating the results of the potato rot in Ireland, and this is a specimen of the "finest peasantry in the world," the class for whom the *Freeman* distributes thin slices of agricultural information flavoured with treason:—

The county of Cork is essentially a dairy district, possessing an agricultural industry in the manufacture of butter. It cannot, therefore, be considered an extreme case if we quote it in illustration of the subject which we have chosen as the title of this article. The genuine Irish farmer, be it known, has a great aversion to hard work, and the several people dependent upon him, whether men, women, or children, appear to have the imitative faculty very strongly developed in that direction. One consequence is that the farmer does not generally make his own butter, but lets his cows to a butter-maker, and the whole of his farming operations are conducted on the same principles. As a specimen we may take an honest, sober, lazy occupier of about sixty acres, who has been on the verge of bankruptcy for some years, and has been kept afloat by the assistance of a rich brother-in-law. The appearance of this man would not disgrace the professional "casual." His outer garments had once been frieze, but what with holes and rents, patches and darns, the original material would have been difficult to discover, but for the fact that it still constituted, so to speak, the framework of his habiliments. As to underclothing, apparently he had none, and his hat would have made the fortune of an "Irish comedian" at a low-class music-hall. This man's farmhouse was approached by an almost impassable occupation road, which appeared worse by contrast in consequence of its leading from an exceedingly well-kept high road. The ordinary course which this farmer pursues is to keep about eight cows, which he lets to a butter-maker for £49 or £50 per annum—a sum just about sufficient to pay his rent and taxes. Thus, in the absence of any great calamity, such as potato disease or foot and mouth, he manages to pay his rent from year to year with the money which he receives from the butter-maker; and, in the absence of any inducement to great exertion, he allows his land to produce about one-half the quantity that the nation might fairly expect from it. He and his family live chiefly on the produce of the potato-ground, and if the season is very good he may, notwithstanding his laziness and want of thrift, manage to obtain a larger crop of oats than is required to keep the life in the one or two wretched specimens of horse-flesh which he is obliged to maintain for ploughing, carting, and other ordinary requirements of his farm.

This farmer requires a labourer to assist him. His nominal wages are, be it observed, 3s. a week and his food, and he has a wife and family at home to provide for. From his weekly wages are deducted 6d. per week for his house, and 6d. per week for his plot of potato land, leaving, therefore, 2s. per week to meet any demands that are required to supplement the produce of the potato land. By hook or by crook the labourer has hitherto saved money enough, or sold potatoes enough to buy a pig and a sheep, besides which he has little difficulty in setting up a small poultry-yard. The pork and mutton increase the family wealth, the wool contributes to their clothing, and the eggs and chickens are devoted to the traditional purpose of supplying them with boots and shoes. Thus, with a plentiful crop of potatoes, even the Irish farmers labourer has hitherto managed to keep the wolf from the door. Unfortunately, however, for the labourer's family, he has all his eggs in one basket; in other words, if the potatoes fail, the family must starve.

Now, this is the sort of agricultural condition to which a certain class of desk politicians would reduce England. Even Mr. Lucraft knows better; he would confiscate the land, but farm it under State paid officers on a great scale, with all the aids of machinery.

PROVISIONAL ORDERS FOR 1872.

Eleven Provisional Orders, granted under the Gas and Water Works Facilities Act, have been confirmed by two Acts of Parliament. The two following Orders authorize companies already possessing statutory powers to raise additional capital:—

The *Ossett Gas Order* empowers the Ossett Gas Company to raise further capital, to the extent of £28,000, by the issue of stock or shares, ordinary or preference, the prescribed rate of preference dividend being 6 per cent., and on ordinary shares 7 per cent. Borrowing power to the usual extent of one-fourth of the capital is also granted. The company may issue debenture stock in respect of any of the money authorized to be borrowed. The Gas-Works Clauses Act, 1871, is incorporated, and is to have effect as controlling or superseding the inconsistent provisions of the Ossett Gas Act, 1855. The company are to pay interest on deposits by way of security. The gas is to have the illuminating power of 14 candles, and is to be tested in accordance with the provisions of the Gas-Works Clauses Act, 1871.

The *Portsea Island Gas Order* empowers the Portsea Island Gaslight Company to raise £100,000 additional capital, and to borrow £25,000. The dividends payable are limited, as follows:—To 7 per cent. so long as the price of gas exceeds 3s. 8d., to 8 per cent. when the price is 3s. 8d., to 9 per cent. when the price does not exceed 3s. 4d., and to 10 per cent. when the price is not more than 3s. The company may issue debenture stock. Power is given to purchase by agreement additional land, not to exceed 15 acres. Gas is to have the illuminating power of 14 candles, tested by a new London Argand No. 1 burner, with chimney according to circumstances.

The following nine Orders relate exclusively to gas undertakings:—

The *Bungay Gas Order* gives statutory authority to the private undertaking of Mr. T. H. Methven, supplying the townships of Bungay and Ditchingham, the capital employed in which is not to exceed £4500, without further authorization. The gas is to have the illuminating power of 14 candles, and is to be in all respects in accordance with the provisions of the Gas-Works Clauses Act, 1871. The test-burner is Sugg's London Argand No. 1, with chimney according to circumstances. The price is not to exceed 5s. per 1000 feet. The undertaker is to pay interest on money deposited as security. The general powers of a gas company are conferred.

The *Cleator Moor Gas Order* confers statutory authority on the undertaking of the Cleator Moor Gas Company, Limited. The capital is not to exceed £6000 without further authorization. All the usual powers of a gas company are granted. The gas is to be of the illuminating power of 14 candles, tested by Sugg's London Argand No. 1, with chimney according to circumstances, and is to be in all respects in accordance with the provisions of the Gas-Works Clauses Act, 1871. The price is not to exceed 7s. 6d. per 1000 feet, with discount for prompt payment at the end of a quarter, calculated at the rate of 10 per cent. *per annum*. The undertakers are to pay interest on deposits.

The *East Ardsley Gas Order* confers on the East Ardsley Gaslight Company, Limited, all the general statutory powers of a gas company. The share capital is not to exceed £6000. The gas is to have the illuminating power of 14 candles, and is to be in all respects in accordance with the provisions of the Gas-Works Clauses Act, 1871. The price is not to exceed 7s. 6d. per 1000 feet. Interest is to be allowed for deposits.

The *Elstree and Boreham Wood Gas Order* confers statutory authority on the undertaking of Messrs. Douglas and M'Claren, at Boreham Wood, for the supply of gas to certain parishes in the counties of Herts and Middlesex. The capital of the undertakers is not to exceed £10,000. The gas is to have the illuminating power of 14-candles, and the price is not to exceed 6s. per 1000, provided that every fraction of 100 may be charged as 1000. Power is given to purchase by agreement two acres of additional land.

The *Ruthin Gas Order* empowers the Ruthin Gas Company to maintain and continue gas-works for the supply of the borough of Ruthin and parts of several parishes lying within the borough. The capital of the company is not to exceed £8000. The gas is to have the illuminating power of 15 candles. The Order fixes the following scale of prices:—

When the quarterly consumption is under	s.	d.	
5000 cubic feet	6	8	per 1000.
Over 5000 and under 10,000	6	3	,,
Over 10,000 and under 30,000 . . .	5	10	,,
Over 30,000	5	0	,,

But if the quarter's bill be not paid within a month, the undertakers may charge the additional sum of 1s. 8d. for every 1000 feet supplied during the quarter, so that the price to a small consumer who does not pay promptly may be 8s. 4d. per 1000 feet. Interest is to be paid on deposits. Gas is to be supplied at a pressure of 8-10ths from midnight to sunset, and 15-10ths from sunset to midnight. The test burner is the London Argand No. 1, with chimney according to circumstances.

The *Swinton and Mexborough Gas Order* gives statutory authority to the Swinton and Mexborough Gaslight Company for the manufacture and supply of gas. The Order authorizes the company to raise £10,000 additional capital limiting the dividend payable thereon to 7 or 6 per cent., according as the shares are ordinary or preference. Power is given to purchase land for works, and three acres additional. The gas is to have the illuminating power of 14 candles. The maximum price is to be 5s. within a mile and a quarter of the works, and 5s. 10d. beyond that distance. Within such parts of the limits of supply as are situated on the same or a lower level than the sill of the gate of the works, gas is to be supplied to consumers at a pressure of an inch and a quarter from midnight to sunset, and two inches from sunset to midnight. The testing clauses of the Gas-Works Clauses Act, 1871, are incorporated, and the test burner is to be Sugg's London Argand No. 1, with chimney according to circumstances.

The *Wellington (Salop) Gas Order* confers the usual statutory powers on the Wellington Coal and Gaslight Company. The original capital of the company is £12,000, and this Order authorizes the undertakers to raise £9000 additional, on which the dividends are limited to 7 or 6 per cent., according as the shares are ordinary or preference. Gas is to have the illuminating power of 14 candles, and the price is not to exceed 5s. within the limits of the Wellington Improvement Act, or 6s. outside those limits. The test burner is Sugg's London Argand No. 1.

Two Provisional Orders have been granted to companies supplying both gas and water.

The *Blaenavon Gas and Water Order*, so far as it relates to gas, gives the company all the usual powers of a gas company. The gas is to have the illuminating power of 14 candles, and the price is not to exceed 5s. per 1000, provided nevertheless that any fraction of 100 feet may be charged as 1000. The share capital of the company is not to exceed £12,000 without further authorization.

The *Ystrad Gas and Water Order* extends the limits of supply of the Ystrad Gas and Water Company, and empowers the company to raise £12,000 additional capital, and to borrow £3000 under the usual restrictions. In this instance, the dividends payable on the additional capital are not limited. The gas is to have the illuminating power of 14 candles, and is to be in all respects in accordance with the provisions of the Gas-Works Clauses Act, 1871. The price fixed by the Ystrad Gas and Water Act, 1868, is left unchanged.

Circular to Gas Companies.

THE reports of the half-yearly meetings of the gas companies, metropolitan and provincial, we publish to-day, tell but too plainly the effect of the recent rise in the price of coal, iron, and labour, and show the anxiety pressing on the directors as to the future of our industry. Unfortunately, we have not yet seen the worst of these rises. The next half year's accounts will probably, in many cases, show worse results than the last, for although it seems unlikely that the present price of coal and iron can be maintained much longer, a return to former rates is highly improbable, and immediate relief will not be felt. In this state of things long contracts, except at small advances, cannot be made, and the feeling of uncertainty weighs heavily on the minds of directors and managers. The increased rate of wages we believe may be considered as permanently established, and it is possible that still larger demands may be made.

The metropolitan companies in general are unfortunate in not being able to make up their maximum dividends without taking some amount either from their reserve-fund or from "undivided "profits." The Chartered Company take £4500 from the latter source. Compared with the corresponding half of the previous year, the accounts of this company show an increased sale of common gas to the extent of 48 millions of feet. In cannel gas, however, there is a diminished supply of over 11 millions of feet, and there is a decrease of £4157 on public lights and contracts. The balance of net revenue certified by the official auditor as applicable to payment of dividend on ordinary stock is £64,754. In the corresponding half of last year the amount so certified was £72,425, but it must be borne in mind that this half year additional preferred capital had to be provided for. In the next half year's accounts of this company the accounts of the Western Company will be incorporated, and the advantages of the amalgamation will be clearly visible.

The Phœnix Company are also compelled to make a draw upon undivided profits to make up their maximum dividends. The amount withdrawn in this instance is £3150. The South Metropolitan Company take £734 from undivided profits, leaving their reserved fund untouched. It seems that the company have accumulated £17,000 of such profits beyond their reserved fund of £20,000. The London Company take £3634 from their reserved fund of £21,000. No one of these companies, not charging the maximum price, has made any advance, and it may be found that the results of the current half year's working will necessitate a still further draw upon reserved funds and undivided profits. In contrast to these we may place the Commercial Company, who pay the maximum dividend, and carry over £2000; and, with a reserve-fund of £39,799, nearly equal to a year's statutory dividend, add 3d. to the price of gas. The Surrey Consumers Company are able to pay a 10 per cent. dividend, and carry over the sum of £1539 8s. 1d., but they charge 4s. per 1000 feet. The Crystal Palace District Company are also fortunate in being able to pay full dividends, but after doing this they have only a balance of £63 to carry over. The Alliance and Dublin Consumers Gas Company are only able, for the past half year, to pay a dividend at the rate of 6 per cent. per annum, instead of 8 per cent. as usual. Coals have cost this company £12,000 more in the past half year than in the previous, and they have been compelled to submit to large advances in wages.

The severest pressure of these times, however, falls upon the small provincial companies, many of whom have been in straits to procure coal at any price, and who have but a limited market for products. It is not surprising then that we have again a long list of advances in price to publish. At Bideford, the price has been raised to 5s. 6d.; at Bo'ness, N.B., 10d.; and at Bradford-on-Avon, 5d. per 1000 feet has been added; the Bury Improvement Commissioners have also advanced their price 10d. The Commercial (London) Company have raised the price 3d. At Glossop the price to large consumers and public lamps has been raised 5d.; at Holmfirth, 5d. has been added. At Kirton an advance to 8s. has been made; at Longwood to 5s. 6d. At Markinch, N.B., 2d. has been added; at Modbury, 1s. 3d.; and at Newton Abbot, 5d. At Radcliffe and Pilkington the price has been advanced to 5s. 5d.; at Rhymney, 9d. has been added; at Rugby, 5d.; and the Salford Corporation, following the example of Manchester, has added 2d. At Stirling the price has been advanced to 5s.; at Stockport, 4d. has been added, and not 1s. as recommended by the Gas Committee. At Stoke Fenton and Longton the price has been raised to 3s. 6d.; at Swansea, 3d. has been added; at Uttoxeter, 5d.; at Willenhall, 3d.; and at Witham, 10d.

The new metropolitan gas referees have issued their "Instruc-"tions" for the six months from October to March. They are substantially the same as those of their predecessors, but since chemicals are not now supplied by the referees, directions have been given according to which each examiner may prepare for himself the standard solutions required for the determination of ammonia. As these directions are simple and precise, we have printed them in another column for the information of managers who may wish to determine the amount of ammonia in their gas. The maximum amount of ammonia now allowed in the gas of the companies subject to the referees is 2½ grains. For gas made at Bow and Beckton the maximum amount of sulphur allowed is 20 grains in 100 cubic feet—a limit which may possibly give rise to a good many appeals to the chief gas examiner during the coming winter. No limit of sulphur is fixed for the gas made at other stations of the Chartered Company, or for the gas of the Imperial and South Metropolitan Companies.

We insert a courteous reply from the ex-referees to the letter of their *quondam* colleague, which appeared in our last. They claim to have had a fair share in all the work done at the office of the referees; and as regards sulphur purification, they pertinaciously insist on the fact that since the publication of their report on sulphur purification at Beckton, the amount of "sulphur" has been reduced to a remarkable extent, while the "unaccountable" fluctuations have wholly disappeared. *Post hoc?* or *propter hoc?* That is the question requiring an answer, which we suppose will be supplied in time.

There is nothing in Provisional Orders for 1872 which calls for notice, but we may remark that the advantages offered by the Gas and Water-Works Facilities Act for obtaining statutory

authority are becoming appreciated by gas and water companies, and will no doubt be still more appreciated as they are more widely known. These orders, when confirmed by a general enactment, have all the force of special Acts, and are obtainable at much less cost.

Probably we are speaking within bounds when we say that there are at least a hundred inventions (patented and others) afloat for the carburation of air for illuminating purposes, or for the volatilization of hydrocarbons, so that the *vapours* may be burned to afford light. Some of these have been tried on a considerable scale, and it is hardly necessary to say have turned out egregious failures. Nothing is more easy than to exhibit, as was exhibited in the City the other day, a single Argand burner, or a row of burners, supplied with carburetted air; but to distribute this over a single house, not to speak of a larger area, is quite another thing. How many companies must be started, and how much money must be spent, before people become satisfied that if they do burn hydrocarbon oils it is cheaper and better to burn them with wicks, in which way they get the full value of the oil, which they never do in any air-carburetting system. The last invention of the sort now alluded to would not be worth notice but that it is brought out with a strong recommendation from South Kensington—a recommendation which will have a different effect on different intelligences. A statement often made is that the failure of these inventions is due to the opposition of gas companies—a statement which unfortunately commands the sympathy of ignorant minds. It is unnecessary to tell intelligent people that all the gas interest in the world could not prevail against a better and cheaper means of illumination. Gas companies hold their privileges at the risk of being superseded by some better system, and if any be discovered the companies must put up with the consequences. We do not believe, however, that they have aught to fear from air gas.

Mr. Flintoff might be safely left to himself, but he has found a coadjutor in the person of Mr. E. Dresser Rogers, who is, as our readers well know, a gas agitator of some long standing. At the last meeting of the London Gas Consumers Protection Association, Mr. E. D. Rogers took the chair, and put to the vote the following resolution, which was, of course, carried unanimously:—

That the Metropolis Gas Act and the City of London Gas Act are measures calculated to perpetuate the monopoly in the trade of gas-making, which imposes a burdensome tax upon the community, and ought to meet with the most strenuous opposition of the public; it being the opinion of this meeting that the supply of gas should be vested in the local or Government authorities, so that the profit to be derived from the sale of gas may be devoted to the reduction of taxation, as is the case in Manchester, Salford, Rochdale, Glasgow, and other places, and that application should be made to Parliament in the ensuing session to give effect to this resolution; and that the Corporation of the City of London, the Metropolitan Board of Works, and the several metropolitan vestries be appealed to for their assistance in carrying the same into effect.

A copy of this resolution was duly forwarded to the Metropolitan Board of Works, and, alas for the inconsistency of human nature! when mention was made of it at the meeting of the board, and one member proposed that it should be referred to the Works Committee, Mr. Rogers said that the board could take no step on such a communication. The letter should simply be acknowledged. Of course, no one would doubt the sincerity of Mr. Rogers in the agitation, any more than they would that of Mr. Flintoff.

The interesting lecture delivered by Mr. Wills to the Manchester Association of Gas Engineers, which we publish to-day, might pass with a simple commendation to our readers, but for the claim made for Dr. Odling of being the first to suggest the removal of bisulphide of carbon by the proper application of foul lime. This is a claim we do not believe Dr. Odling would make for himself. If he should, he will have to settle with Mr. Harris, Mr. Trewby, Mr. Evans, and the late referees, not to speak of other engineers and chemists.

Correspondence.

RYDE GAS.

SIR,—I am by no means inclined to complain of your notice of my "story," but shall feel obliged, as the point raised is one of public interest, if you will kindly allow me to ask, wherein is the difference between multiplying the net profits, in this or in any case of the kind, at a *small* number of years purchase, or the "statutory" profits at a *greater* number, which would give the same result? and in what Act of Parliament is any limit fixed to the multiplying number?

Of course there can be but one answer; there is no rule laid down, no limit fixed.

I respectfully demur to your ingenious Turkish parallel, and to the assumption that the shareholders of the Ryde Company were as helpless as the Turk whose title to a decoration was not perfect; *they* did, under my advice, so far "set their house in order" fit for the battle as to issue shares to the extent of £4000, which gave them a title to £280 per annum in addition to their former dividends, and they could just as easily have added another £2000 as not, and this would have had the effect of still further adding to the amount of "statutory dividend" the sum of £140, which multiplied by 22½ years purchase would give £3150 for the £2000.

Therefore, my contention is that the difference between the two modes of dealing with the subject is more *nominal* than real, and that this and every case of the kind must rest on its merits.

21, *Parliament Street, Westminster, S.W.*, R. P. SPICER.
Oct. 5, 1872.

INCREASED COST OF MAKING GAS.

SIR,—I shall feel obliged if you will permit me to say a word or two on this subject in your next publication, by way of reply to the several communications addressed to me thereon.

The committee, when they meet to consider the question, will have before them the communications from the several companies, which will enable them to determine what is the best course, and whatever that may be, it will be submitted to the companies for their approval before any active steps are taken to carry it out.

I am unable to say now how the costs, in the event of an application to Parliament being determined upon, will have to be paid; that will be settled by the committee. The mode in which such cases are usually dealt with is to apportion the amount *pro ratâ* according to income among the several companies interested. In no event, however, will any company be held liable to pay any portion of such costs without having previously consented so to do.

W. LIVESEY, *Sec. to the Association.*
Gas and Water Companies Association, 6, Victoria Street, Westminster, S.W., Oct. 5, 1872.

GAS PURIFICATION.

SIR,—The very voluminous report of the London Gas Referees, published in the JOURNAL OF GAS LIGHTING of the 23rd of April last, opens up a wide field for thought and inquiry. In seems to the writer that, in dealing with this question, there is one important point which has been entirely overlooked, although it is one which may seriously affect the question at issue. I refer to what may be called the *economic velocity* at which gas should pass through the purifiers, for there must necessarily be some certain velocity at which the gas should travel in the operations of manufacture and delivery in order that those operations may be performed with economy—that is to say, with a judicious application of time, labour, and material.

Let us analyze the facts which are laid bare in the valuable report of the referees, and see if we cannot find some clue to the mysterious and startling results therein described, or at least ascertain whether or no the purifying power of the apparatus at the Beckton Gas-Works is on a par with the magnitude of the operations carried on at that establishment.

Unfortunately the report in question does not give us all the particulars that are required to make a comparison with the other works alluded to in the report, excepting in the case of the Bow Common station. However, I shall attempt to show that this latter station exceeds in purifying power that of the Beckton station—the ratio being 5 to 3.

In order to do this, I shall start with the assumption that the correct way to estimate the comparative value of a purifier as a purifying agent is to first ascertain the velocity at which the gas has to pass through it while in operation, or what is the same thing, but more convenient in practice, to ascertain *the superficial feet of areas that we have at disposal for each* 1000 *cubic feet of gas that we desire to pass through in one hour.* This is the primary consideration. The next is the total depth of the material in the purifier, or if more than one be in action at the same time, one after the other, then the total depth of the material in all the purifiers must be taken.

It is clear that we cannot arrive at any correct conclusion by taking the *combined* area of all the purifiers. For instance, we are told that the area of all the purifiers at Beckton station is 11,780 square feet; but unless we know what is the area of each vessel, how are we to judge of the value of this total number of square feet? It would be possible to have this number of square feet, and yet be in a wretched position for purifying, while a smaller number of square feet might in reality be the most powerful apparatus. Thus:—

		Superficial feet.
100 vessels, rectangular,	12 ft. × 10 ft. =	120 × 100 = 12,000
8 vessels, square,	36 ft. side =	1296 × 8 = 10,368

In the first instance we have a purifying area in each vessel for a make of 125,000 feet per hour of 120 ÷ 125 = 0·97 super. feet, and in the second 1296 ÷ 125 = 10·3 super. feet!

It is true that one hundred purifiers would be a very reprehensible practice, and I only use that number to prove that the total number of purifiers is not—as used by the referees—a correct exponent of useful superficial area.

Now, as to the depth of material through which the gas should be made to percolate, this, without doubt, plays an important part in the economical purification of gas; but it matters not, in its chemical action upon the gas, whether we pass it through 10 purifiers containing 60 feet of total depth of material, or one purifier containing the same depth in that one vessel. The total depth of material that can be used is limited, as far as the working part is concerned, chiefly by the proportion which exists between the hourly make of gas and the area of the purifier. It is customary, for

economy's sake, among other things, to continue to pass the gas through a certain depth of material already partly saturated with impurities, in order that this strata may be completely saturated before removal, as although it will not perfectly purify the gas from sulphur, yet it is to a certain extent capable of absorbing a large per centage of impurities, but to what extent this can be economically carried has never been reduced to a chemical nicety, and it is, therefore, usual to find the practice vary according to the judgment of the engineer, he being guided in some measure by the "working pressure," that is to say, the difference in pressure between the inlet of the first purifier and the outlet of the last one in action, which pressure varies as the porosity of the material becomes reduced by saturation with impurities, and must not be allowed to exceed the depth of the purifier's lutes. With regard to the total depth of material through which the gas is driven in the purifiers, I think it will be found that 12 feet in depth is rarely exceeded; and as regards the depth of material used in each purifier we are, with proper area, only limited by the depth of the vessel itself, that is to say, the purifiers through which the gas has to pass should pass the maximum make of gas when fully charged within a certain predetermined working pressure, and if they will not do this, there is clearly a deficiency of area; for if they cannot be *fully charged*, is not the space-depth thrown away?

Purifiers are generally designed, as regards depth, in such a manner that a man can with one lift with a shovel throw the material out of the bottom tier either over the lute or, where the breadth of the vessel exceeds 12 feet, into barrows run in upon planks.

I believe it to be pretty well agreed upon in practice that 5 feet is a proper working depth, it being the maximum depth we can go, *until we get into large-sized purifiers*, without incurring a second lift, or the application of machinery.

As regards the number of sieves to be used in each vessel we must be guided by the nature of the material, for if it be laid on too thin the gas will blow holes through it, and if too thick the gas will not percolate evenly through the whole depth of the strata, the tendency being to pass at an angle through that portion which lies nearest to the outlet-pipe. I believe, however, it is to be pretty generally agreed upon that, taking all circumstances into consideration, 6 inches for lime is an economical depth to be placed on one sieve. The porosity of oxides differs, and so, therefore, must the depth used; but one foot, I think, may be taken to be the minimum, and perhaps 2 feet as the maximum on each sieve in general practice.

I have ventured to go some length into these particulars as according to the referees report the practice seems to be very variable and it would be of great value if they could find out which gives the best results, in order that we may all benefit by it.

With regard to the purifying operation mentioned in the report, it appears that at Beckton station there are two works, and in one of these works 125,000 cubic feet of gas per hour is purified by 12 purifiers, each of circular shape and 25 feet diameter, the net area of one vessel being 491 square feet; the depth is not mentioned. At Bow Common the make is about the same, the total number of purifiers being seven, square in shape, the side of square being 26 feet, and the net area of one vessel being 676 square feet; the depth is not mentioned.

The purifiers in action at one time in the Beckton station being *nine*, of these two sets of three are used (simultaneously) for lime, each set having a total depth of 6 feet of lime; and three sets are used for the oxide, containing also 6 feet in depth; therefore the total depth of lime and oxide through which the gas has to pass is in all 12 *feet*—6 of lime and 6 of oxide.

The purifiers in action at one time in the Bow Common station are *five*, the set for lime being two in number, and having a total depth of 3 feet 4 inches; and the set for oxide being three in number, the total depth being 9 feet 6 inches; therefore the total depth of lime and oxide through which the gas has to pass is in all 12 *feet* 10 *inches*—3 feet 4 inches of lime and 9 feet 6 inches of oxide.

The Beckton purifiers run for 22 hours only before requiring renewal, while the Bow Common run for 80 hours! The relative quantity of gas purified will, therefore, stand as follows:—

Gas Purified by One Purifier.

Beckton .... 22 × 125 = 2,750,000 cubic feet.
Bow Common 80 × 125 = 10,000,000 „

Now, what is the cause of this vast difference? It is true the referees state that the Beckton condensing apparatus is imperfect and insufficient, but although this would throw a deal of useless work on the purifiers, yet it is hardly sufficient, I presume, to account for this great discrepancy. Has not the small area of the purifiers more to do with it? We see from the report that one set of lime purifiers was not equal to the passage of the whole of the gas in consequence of, as it is stated, the "*back pressure*" being too great; and it therefore became necessary to split up the volume of gas into two parts (thereby reducing the velocity 50 per cent. in the lime vessels); but the full benefit was not derived from this, as that hobgoblin, "*back pressure*," again stepped in, and caused the major portion of the gas to pass through one only of the sets.

It is a pity we cannot glean from the referees report what rule regulated the changing of the lime vessels from time to time. Is there one rule adapted for the lime and another for the oxide? and was it a chemical test, and if so what was the test? However, let us apply the *velocity test*, and see how the Beckton purifiers bear comparison with those of the Bow Common and some others.

The sizes of purifiers and make of gas given in the following table, except those of Beckton and Bow Common, have been extracted from Clegg on "Coal Gas," 4th edition.

Works.	Size of Purifiers.	Hourly Make. per 1000 Feet.	Purifying Area per 1000 feet of Gas. Super. ft.	Velocity in Feet per Hour.
Commercial..	Square, 24ft. side = 576ft. area	100	5·76	173
Bow Common	Square, 26ft. side = 676ft. area	125	5·42	184
Fulham	Rectangular, 37ft. × 20ft. = 740ft. area	145	5·10	195
Beckton	Circular, 25ft. diameter = 491ft. area	125	3·93	254

This table shows at a glance that we might expect the Beckton purifiers to be doing much less useful work than those of the Bow Common, yet, in the absence of bad condensation, one would not have expected to see such a wide difference, the one passing only two million while the other passes 10 million.

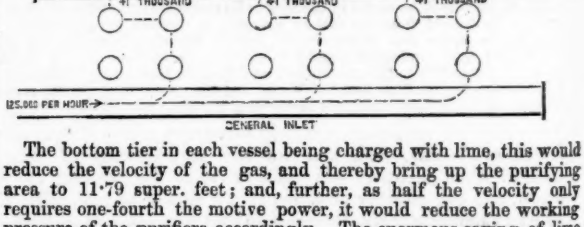
I have myself found, when experimenting roughly, on a large scale, that the gas purified per purifier, other things being equal, was in direct proportion to the velocity of the gas, or, in other words, to the purifying area of the vessel; that is to say, a purifier having an area of 50 super. feet per 1000 feet of gas made per hour, would cleanse ten times the quantity that one would having only 5 super. feet.

The following table shows that this proportion does not hold good in the case under discussion:—

	Gas Purified per Purifier.	Purifying Area per 1000 Feet of Gas.	Gas Purified per Super. Ft. of Area.
Beckton	2,750,000 feet	3·93 super. feet	700,000 feet.
Bow Common	10,000,000 „	5·42 „	1,845,000 „

It, therefore, tends to show that the gas at the Bow Common station must undergo a superior cleansing process before it enters the purifiers. Probably the gas is reduced to 60° or 65° Fahr. at the outlet of the condensers, and then thoroughly washed with pure cold water, and not allowed to exceed 60° Fahr. before entering the purifiers, and if so it will at once account for the difference. In fact, the action of the "purifiers" cannot be properly studied unless we have the history of the purification from the commencement, which is as soon as the gas reaches the condensers, the "purifiers" giving only the *coup de grâce* to the process.

In conclusion, if my reasoning holds good, some improvement would take place at Beckton by working the three sets of purifiers simultaneously, thus:—



The bottom tier in each vessel being charged with lime, this would reduce the velocity of the gas, and thereby bring up the purifying area to 11·79 super. feet; and, further, as half the velocity only requires one-fourth the motive power, it would reduce the working pressure of the purifiers accordingly. The enormous saving of lime and labour that would take place is also worthy of some consideration.

BACK PRESSURE.

THE EX-REFEREES AND MR. F. J. EVANS.

SIR,—It is with sincere regret that we have to enter into controversy with our former colleague, Mr. Evans, with whom we worked together harmoniously during the seventeen months he was in office, and with whom we subsequently remained on the most friendly terms, until we were necessitated, in the discharge of our duties, to report upon the failure of the sulphur-purification at Beckton and the causes of it. We are happy now, as we have ever done, to bear our testimony (than which in such a case no other can be equally valuable) to the perfect impartiality with which he acted as a gas referee; and he is right in saying that his resignation, in consequence of the baseless imputations against him of partiality to the gas companies, was sincerely regretted by us.

For obvious reasons it was not contemplated by the Act of Parliament, or desired in any quarter, that more than one of the referees should be practically acquainted with the manufacture of gas; and Mr. Evans was the "practical" man. But as to our "competence and impartiality," we are quite willing to be judged by the fruits of our four years of office—by the manner in which we discharged our duties, alike by what we did and by what we refused to do.

While cheerfully acknowledging the valuable assistance of Mr. Evans in organizing the constitution of the Office (now wholly altered) and the mode of gas-testing, we must object entirely to his assertion that all that has been done, or even the greater part of it, has been due to himself. For example (as he knows well), with the exception of the short report on the standard burner, every one of the reports on gas matters associated with the name of the gas referees was prepared and issued exclusively by us. Our "First Report on the Sulphur Question" was drawn up and issued six months after Mr. Evans had ceased to be a referee, and when we two were alone in office. The "Ammonia Report" and the "Report on Gas-Burners and the Principles of Gas Illumination," as their dates show, were issued still later. Whatever credit attaches to these

reports—and their usefulness has been generally acknowledged—belongs entirely to us.

Again, as to the apparatus for testing gas. The most important of these instruments is that known as "The Referees Sulphur Test." The new features in this instrument are—(1) the perforated box at the bottom of the trumpet-tube, for shielding the open end of the tube against draughts, and for regulating and adjusting the air supply; (2) the use of solid carbonate of ammonia instead of liquid ammonia; and (3) the upright cylinder filled with glass balls. Not a single one of these various parts of the instrument was proposed by Mr. Evans. The two first were devised and adopted, after adequate experiments, by ourselves, and after Mr. Evans had left us; the third (namely, the upright cylinder) had been previously devised by our chemical assistant, Mr. W. H. Thompson. The improvements of detail in the present Ammonia Test, as compared with the apparatus of substantially the same kind formerly in use, were made by Mr. Thompson when Mr. Evans was with us; and subsequently various improvements have been made in the testing apparatus, partly by us and partly by Mr. Thompson, each trivial of itself, yet together adding not a little to the efficiency and convenience of the testing apparatus. We may add that it is hardly an exaggeration to say that the whole routine duties of the office have from first to last been discharged by us.

It is with reluctance that we make these statements; we only do so in consequence of the assertions made by Mr. Evans in his letter to you. At the same time we may say that the more searching the investigation of the facts of the case, and the more public the results of it, the greater will be our satisfaction.

Our report on the sulphur purification at Beckton, which has so deeply wounded Mr. Evans's *amour propre*, dealt as lightly as possible with the extraordinary and unparalleled failure at those large new works, as every one cognizant of the facts of the case will acknowledge. Indeed, as the extent of the failure was a matter of notoriety, evidenced daily by the returns of the gas examiners, the cause of offence appears to be simply that we were enabled to discover the causes of the failure and to suggest efficient remedies. This is what Mr. Evans calls "charging not only myself, but the whole body of gas engineers and chemists, with the grossest ignorance of the methods of purifying gas." It will be news to us if the gas engineers either of London or of the provinces, or the chemists either, feel bound to approve or uphold the methods of gas purification adopted at Beckton.

As our "Supplementary Report on the Beckton Works" (printed in your JOURNAL of Sept. 12) replies by conclusive *evidence* to the vague and unsupported *assertions* that have been made, we need not add a word on the subject at present, although further evidence is ready if required. The fact, however, is indisputable that the amount of "Sulphur" in the gas made at Bow and Beckton since our report was published has been reduced to a remarkable extent, the average at Beckton having fallen from 35 to 10 grains, and at Bow from 21 to 4½, while the excessive and "unaccountable" fluctuations in the amount of sulphur have wholly disappeared, showing that the gas purification is now under complete control.

In conclusion, we may observe that we have not seen the letter of Dr. Pole alluded to by Mr. Evans; but, from letters of our recent colleague, we are enabled to state that, whatever be the objection which he makes to our reply to the Chartered Company, it has no reference (to use his own words) to "the merits of the dispute."

R. H. PATTERSON.
JOHN SAMPSON PEIRCE.

21, *John Street, Adelphi, Sept.* 30, 1872.

MUNICIPAL CORPORATIONS (BOROUGH FUNDS) BILL.

SIR,—At the last stage of the proceedings in this matter in the House of Commons, last session, an amendment was made at the instance of this association to the following effect:—

> "Nothing in this Act contained shall authorize any governing body to promote any bill in Parliament for the establishment of any gas or water works to compete with any existing gas or water company established under any Act of Parliament."

This is not what the association asked for, but it is all that they could get. The association proposed that the protection against competing schemes should be extended to all companies alike, but this the promoters peremptorily refused, saying, "When parties supply gas without being subject to any of the regulations prescribed for the protection of the public as to price, illuminating power, purity, &c., they do so in disregard of the public interest, and are not entitled to parliamentary protection; on the contrary, it is more the duty of the local authority under such circumstances to promote other undertakings in order to protect the public."

The Act, as it now stands, gives power to any local authority, with the consent of the ratepayers as respects companies authorized by Parliament, to promote bills for the compulsory purchase of their undertakings, but not for establishing other works to compete with them, and, as respects other companies not authorized by Parliament, to promote bills either for the compulsory purchase of their undertakings, or for establishing others to supersede them.

All such companies are, doubtless, aware of what their positions really are, having no parliamentary powers; the local authorities can stop their further operations at any time they please. If a local authority obtained an Act of Parliament to supply gas in the district of one of these companies, the effect would be not merely competition—though that in itself would be bad enough—with public rates on one side, and private funds on the other, but something much more like confiscation, as the local authority would be able to run their mains into any part of the district, and at the same time to stop the company from extending their mains or services altogether.

The companies, therefore, will do well to consider whether it is prudent to leave their property open to such casualties when they can protect it by getting a Provisional Order or Act of Parliament.

The cost of obtaining a Provisional Order or Act of Parliament must, of course, vary with the nature of the powers applied for. If there is nothing exceptional in them, and the application is not opposed, the former may cost from £150 to £200, and the latter about double that amount. The fees payable to the two Houses for an Act of Parliament alone amount to as much as the entire cost of a Provisional Order in an unopposed case. An opposed case, either for an Order or an Act, may be double or treble that amount, and even more. No general estimate can be given for an opposed case.

Immediately the Act passed, the JOURNAL OF GAS LIGHTING directed attention to the fact that the Act gave no protection against competing schemes to the companies who were supplying gas without the authority of an Act of Parliament; nevertheless, as the Standing Orders of Parliament require that all applications for Acts of Parliament or Provisional Orders shall be advertised for three consecutive weeks in one case, and two in the other, in the month of November preceding the application, and November is now close at hand, you will be doing the companies a service if you will kindly direct their attention to the matter again.

W. LIVESEY, *Sec. to the Association.*
Gas and Water Companies Association, 6, Victoria Street, Westminster, S.W., Oct. 7, 1872.

Miscellaneous News.

METROPOLITAN BOARD OF WORKS.

The First Meeting of the Board after the recess was held at the Offices, Spring Gardens, on Friday, Sept. 27—Colonel HOGG, M.P., in the chair.

The SOLICITOR reported that Colonel Beresford, M.P., had given notice of his intention during the next session of Parliament to call the attention of the House of Commons to the present condition of the metropolitan water supply, and to move a resolution in effect that it was expedient the Local Government Board should, by agreement under the Lands Clauses Act, purchase the undertakings of the several water companies, their works and privileges, with a view to the consolidation of such works, and to ensure a constant supply of water therefrom.

The CLERK read a letter from the Board of Trade, stating that they have appointed Professor Tyndall, Mr. A. G. V. Harcourt, and Dr. Pole, to be gas referees for one year, from the 1st inst., at a salary of £200 each, and transmitting copy of a minute showing the various duties which remain to be performed by the gas referees; also a letter from the gas referees, stating that it is not their intention to undertake the supply of any chemicals, stores, &c., to the gas-testing stations, and transmitting copy of instructions for the gas examiners.

Mr. DRESSER ROGERS, in moving that these communications be referred to the Works Committee to examine and report, said the gas referees originally appointed had been displaced by the Board of Trade, and the gentlemen named in the first letter just read had been appointed in their place. The Act of Parliament under which the appointment of referees took place required that at least one of the gentlemen selected for the office should have a practical knowledge and experience of the manufacture and supply of gas. Without any disparagement of or imputation upon the new referees, he confessed that he was at a loss to understand how either of them could be said to be practical gas manufacturers.

The letters were referred to the committee.

The CLERK said he had received a letter from a Mr. Flintoff, inclosing a resolution adopted at a meeting of gas consumers, stating that in their opinion the supply of gas to the metropolis should be under the control of the local or Government authority, and asking the board to assist in obtaining that end.

A MEMBER proposed that the letter should be referred to the Works Committee.

Mr. DRESSER ROGERS said the board could take no step on such a communication. The letter should be simply acknowledged.

Mr. RUNTZ concurred, and this course was adopted.

DISPUTE IN THE BIRMINGHAM GAS-FITTING AND CHANDELIER TRADE.—A general meeting of the members of the Birmingham Chandelier and Gas-Fitting Masters Association was held on the 24th ult., at the Great Western Hotel, to confer with the committee of the association. About 30 members were present, comprising, with one or two exceptions, all the members of the association. Before the general meeting, a committee meeting was held, at which a resolution was passed, and it was then understood that, whether in the general meeting a lock-out was decided upon, or the committee's resolution was approved, the minority would act with the majority. At the general meeting Mr. H. Heaton presided, and read the following resolution passed by the committee. "That although strongly maintaining the principle of a revision of prices, rather than a bonus, yet, desirous of avoiding the serious consequences which must arise from a strike, alike to the employers and employed, this association accede to the advance of 15 per cent." Mr. Blews proposed the resolution to the meeting, and explained to the members the reasons that had guided the committee in recommending it for the acceptance of the members generally. One serious reason, he said, was, that some of the masters had not joined the association. Another was that the men, being entitled to a rise, and receiving the support of the Brassworkers Association, it was a serious question whether they were strong enough at the present time to act in opposition to the men. There would only be about 25 per cent. of the brassfounders on strike, and the remainder of the trade would all be contributing to their support. Another reason why the resolution should be passed was that the late reduction in the price of copper would materially assist the masters, as they would be able to make the advance to the workpeople without increasing their discounts to their customers. At the same time it was clear that if the whole of the employers in the trade had been united, so that the masters of the whole number of between 3000 and 4000 brassworkers belonging to the men's society were included in the masters society, the masters would now have been in a different position. On the whole, he considered it better to make the advance without a strike, than even to gain some little point by a strike. Mr. Wilcox seconded the resolution, which after some discussion was adopted, and a sub-committee was appointed to arrange with the Brassfounders Association the time when the advance should commence. At a meeting subsequently held between the sub-committee and the representatives of the men, the resolution of the masters was communicated to the latter, who received it with expressions of great satisfaction. It was arranged, after consultation, that, in order to allow time for the completion of work already given out, according to the usages of the trade, the advance should not take effect until "the first full week in November," or a clear month from that time.

PHŒNIX GASLIGHT AND COKE COMPANY.

The Adjourned Half-Yearly General Meeting of Proprietors was held at the Bridge House Hotel, Southwark, on Wednesday, Sept. 25—EDWARD HORNER, Esq., in the chair.

The SECRETARY (Mr. I. A. Crookenden) read the notice convening the present meeting and the minutes of the last half-yearly ordinary meeting, and of the *pro formâ* meeting in July, of which this was an adjournment. These minutes having been confirmed, the corporate seal was affixed to the register of shareholders.

The following report and statements of account were then submitted:—

The directors herewith submit trade account and balance-sheet to the 30th of June last During the past half year circumstances have occurred which have rendered the accounts less favourable than for some time, being chiefly influenced by parliamentary charges, the rise in wages, and the general advance in the prices of almost every article used.

The directors, deeming it desirable that part of the balance of undivided profit should be applied to form a "reserve-fund," have invested £11,190 6s. 8d., being the balance of profit for the year 1871.

The net amount of profit for the past half year £33,525 17s. 3d., which, added to the unappropriated balance of £30,460 5s. 10d. (after paying dividends in April last and the investment as above), makes a total of £63,986 3s. 1d. to the credit of profit and loss as per that account, out of which your directors recommend that dividends be declared as follows, viz.:—

On the £20 divided shares	10 per cent.	per annum.
„ New stock	7½ „	„
„ Capitalized stock	5 „	„

Less income-tax, leaving an unappropriated balance of £27,311 3s. 1d.

Abstract of the Trade Account, Half Year to June 30, 1872.

Dr.				*Cr.*		
To Coals used	£48,907	19	9	By Rental	£105,705	12	1
Materials supplied	12,709	12	1	Coke	20,610	8	8
Meters—repairs and renewals	2,055	5	2	Breeze	256	17	7
Rates	3,828	16	5	Tar	2,487	5	5
Law and parliamentary charges	1,461	11	1	Ammonia	1,566	6	7
Directors, £1000; auditors, £50	1,050	0	0	Rents	1,659	3	3
Salaries and commission on collection	6,540	8	4	Miscellaneous receipts	550	13	6
Wages	18,280	19	7	Interest	93	1	2
Bad debts and allowances	722	6	6				
Interest on bonds	2,875	16	0				
Leasehold-fund	450	0	0				
Rents	431	8	0				
Interest	109	8	1				
Net profit	33,525	17	3				
	£132,929	8	3		£132,929	8	3

Profit and Loss.

April, 1872.—To dividend for half year ended Dec. 31, 1871	£36,225	0	0	Jan., 1872.—By balance brought forward	£77,875	12	6
Reserve-fund	11,190	6	8	June 30, 1872.—By half year's profit	33,525	17	3
June 30, 1872.—To balance carried forward	63,986	3	1				
	£111,401	9	9		£111,401	9	9
				July 1, 1872.—Balance brought down	£63,986	3	1

Abstract of the Balance-Sheet, June 30, 1872.

Dr.					*Cr.*			
To Capital of 27,000 £20 shares, paid in full (maximum dividend 10 per cent.)		£540,000	0	0	By Amount of plant on Dec. 31 last		£902,603	14 7
Capitalized stock, paid in full (maximum dividend 5 per cent.)		144,000	0	0	Expended this half year for extension of works		2,405	3 0
New stock, £360,000, £45 per cent. paid up (maximum dividend 7½ per cent.)		162,000	0	0			£905,008	17 7
Bonds, at 5 per cent.		115,388	0	0	Investment of leasehold-fund		16,968	1 2
Unpaid dividends		119	4	3	Reserve-fund		11,190	6 8
Unpaid tradesmen's bills, &c.		18,529	15	10	Amount due for rental—			
Leasehold-fund		16,968	1	2	Midsummer quarter	£37,385 4 2		
Reserve-fund		11,190	6	8	Arrears	892 5 10		
Balance of profit and loss—							38,277	10 0
Unappropriated balance	£30,460 5 10				Amount due for coke and breeze	£5,025 12 6		
Half year's profit	33,525 17 3				Ditto tar	492 6 11		
		63,986	3	1	Ditto ammonia	639 4 10		
					Ditto sundries	2,907 3 8		
							9,064	7 11
					Stock of coals	£10,163 15 5		
					Ditto coke	78 15 0		
					Ditto breeze	9 2 6		
					Ditto tar	169 14 5		
					Ditto ammonia	143 10 3		
					Ditto retorts	1,973 17 7		
					Ditto pipes	3,644 0 0		
							16,182	15 1
					Meters		41,006	3 5
					Balance at treasurer's		9,483	9 1
					On deposit at interest		25,000	0 0
		£1,072,181	11	0			£1,072,181	11 0

The CHAIRMAN: Gentlemen, I now move—"That the report and accounts be received and entered upon the minutes." In doing so, I think I may say that there never was a period in which the directors of a gas company met their proprietors under such extraordinary circumstances connected with the supply of coal as those under which we meet you on the present occasion. It must be patent to every person who has at all watched the state of the coal market during the last six months that a most anomalous state of things has existed there. A most extraordinary rise in the price of coal has taken place—a rise of an almost unaccountable character, appearing to be rather the result of combination than of demand. When I tell you that this time last year the price of gas coals in the North was something like 6s. or 7s. per ton free on board, and that at the present time the nominal price is 25s. (for I believe that at that price it is almost impossible to get them), you can well imagine that the directors of gas companies generally must have found themselves in considerable difficulty with respect to this matter. Fortunately for us, we had covered ourselves by making contracts previous to this large increase in cost, and we have thus been enabled to obtain our supply of coals at not very greatly enhanced prices. Still you will see by the accounts that our coal cost us upwards of £6000 more during the six months ending June last than they did for the corresponding period of last year. This is accounted for partly by the increased consumption, but principally by the increased price of cannel coal, for which we have no contract, and have had to pay a much higher rate than previously. It is also attributable, to some extent, to difficulties in the way of getting our coals, which difficulties have increased the cost and brought the price to an average, during the last half year, of 15s. 2d., as compared with 14s. 1½d. for the corresponding period of last year, being a little more than 1s. per ton. This increase upon our consumption of 64,000 tons will make pretty well the difference in money which you see in the accounts. Such being the state of the coal market, you will see at once what must have been the position of the company if we had not been tolerably well off with respect to our contract. It would have had the effect of producing a large deficiency in the accounts; because you must understand that this matter came upon us very suddenly, and that most of the companies, ourselves included, had made contracts for our coke for a considerable period forward, so that we were obliged to sell coke at previously existing prices, while exposed to these extraordinary charges for coal. This, we hope, will not occur again. We have got pretty well rid of these contracts, and we believe the current half year's accounts will show a different result to the last, and we shall be dissatisfied if we have not a large increase in our coke returns to cover the increase we have to meet for coals. The labour question, of course, enters very largely into the expenses of a company like this. There has been a great agitation amongst the labouring classes during the last twelve months, and our accounts show that we have had to pay £1872 more for labour during the last six months than we paid in the corresponding period of last year. I am sorry to say we do not think we have quite come to the end of this matter. We have been obliged to make additional concessions to the men, which will still further increase this account. During the last half year we paid £1461 for law and parliamentary expenses. This is an extraordinary charge, and will not appear again, which is so much to the good for the current half year. On the other side of the trade account you will find that the rental has somewhat increased, though I am bound to say not quite so much as we had hoped it would do. The increase upon the corresponding period of last year is only £2273. This is not so much as we should have expected—5 per cent. being the usual increase; but from some cause or other this experience has not been borne out by the last six months. Probably the spring being hot might somewhat have diminished the consumption of gas. However, this is a thing over which we have no control. The result of the half year's working is that we have not earned our maximum dividend by a small sum of money. After all, however, this is nothing to be alarmed at, inasmuch as the items of account to which I have alluded will fully account for the deficiency. We believe that on future occasions our accounts will show a better result, and that there is nothing to make you uneasy in the fact that we are not able to-day to pay the maximum dividend out of the half year's profits. It is probable that but few of the proprietors read the JOURNAL OF GAS LIGHTING, but every fortnight the fact is brought under our notice in that JOURNAL that gas companies all over the kingdom are raising the price of gas. I think some credit, therefore, may be given to the gas companies of the metropolis that, notwithstanding the largely increased cost of iron, coals, labour, and almost every material which enters into use, and is essential in gas-works, they still continue to sell gas at the same price as formerly, and have made no demands upon the public. Many persons would, no doubt, say to us: "Well, if you have not earned enough money to pay your dividend, why not raise the price of gas?" Our reply is that we think it is to our interest to act on the principle of doing as we would be done by. If we were consumers we should say to the company: "You have a large balance over and above what was necessary for payment of your dividends in some past half years; use that at the present time, and wait to see what will be, the state of the coal market and not jump to the conclusion that coals are going to remain at their present price." Well, gentlemen, that is exactly the view we have taken ourselves, and we think that we are studying the interests of the consumers for the time by trenching upon our unappropriated balance to pay our dividends rather than by raising the price of gas. We have this satisfaction, that it is entirely in our own hands to raise the price of gas by notice at any time to cover the additional expenses to which, by the state of the market for raw materials, we are put. We are now selling gas at 3s. 9d. per 1000 cubic feet. An advance of 1d. per 1000 cubic feet would produce £4000, and 3d. would give us £12,000, so that as we have only now a deficiency in our profits of £3150, it would be very easy indeed to make up that deficiency, supposing it should ultimately turn out that the cost of the raw material continues at the existing high rate. I merely mention this that the proprietors may not go away with the feeling that their property or dividends are at all jeopardized by present circumstances. We have it in our own hands to adjust the price should an adverse state of things be maintained; but we think it is the better policy to let it remain as it is at present. I mention it also because, notwithstanding the unfavourable state of the markets for raw material, there is an agitation attempted by certain parties to obtain a reduction of price, which seems an extraordinary thing when existing circumstances seem to point to the necessity for an increase. Your directors believe you will agree with them that they have taken the proper course in determining to continue as we are. We do not anticipate but that we shall be in a better position next half year, and, looking forward to that, we have determined to show to our consumers that nothing but the most absolute necessity would induce us to raise the price of gas. With these remarks I move—"That the report and accounts be received and entered on the minutes."

Mr. PHILLIPS (a director), seconded the motion.

A PROPRIETOR: Why is it that our half-yearly meetings are held so late? It is now three months since the period to which these accounts are made up.

Another PROPRIETOR: What is the amount of the unappropriated balance after payment of the dividend?

The CHAIRMAN: With reference to the first question, I may say I think, with one or two exceptions, our meetings are held as early after the close of the half year as other gas companies in the metropolis. We are holding the present meeting a fortnight earlier than is usual. In reply to the second inquiry, the unappropriated balance, after payment of the dividend, will be £27,311 3s. 1d. But in addition to that, we have invested, as a reserve-fund, during the half year, £11,190 6s. 8d., so that the available amount is upwards of £38,000—much more than enough to pay a dividend, so that we do not think the proprietors need make themselves uncomfortable about our taking a small amount from the undivided balance to make up the dividend on the present occasion. You must recollect that in times gone by we had for several years to go to our undivided balance to make up dividends, so that this is not a new thing to do.

A PROPRIETOR: Is the item of "Reserved fund" on the credit side of the balance-sheet represented by that amount in Consols?

The CHAIRMAN: No; we have invested it so as to get a better interest than Consols. It is invested in South-Western and North-Eastern Preference Stock.

The motion was then put and carried unanimously.

On the motion of Mr. SHAND (deputy chairman) it was resolved—"That dividends for the half year ending the 30th of June last be and the same are hereby declared and made payable out of the profits of the undertaking, at the following rates—viz., at and after the rate of 10 per cent. per annum on the original shares of the company; at and after the rate of 5 per cent. on the capitalized stock; and at and after the rate of £7 10s. per cent. upon the amount paid up on the new stock of the company; deducting income-tax on each of the above. That such dividends be payable to the bankers of the proprietors so ordering it, and that the remaining dividend warrants be forwarded by post."

A vote of thanks to the chairman and directors was then cordially adopted.

The CHAIRMAN, in acknowledging the vote, said: Gentlemen, on behalf of my brother directors and for myself, I beg to thank you for the compliment you have paid us. I can assure you that the present state of circumstances gives us no little anxiety. We are, therefore, pleased to find that you appreciate our exertions, and we assure you that no effort will be wanting on our part to promote the best interests of the company.

COMMERCIAL GAS COMPANY.

The Ordinary Half-Yearly Meeting of the Proprietors of this Company was held on Friday, the 4th inst.—J. H. WILSON, Esq., in the chair.

After the usual formal business, the following report and statement of accounts were presented:—

The directors report that during the half year ending the 30th of June last, a net profit of £23,860 12s. has been realized, and they recommend that a dividend of £5 per cent. for the half year (less income-tax) be declared.

In accordance with the resolution passed at the last meeting of the shareholders, the share capital of the company has been converted into capital stock.

The directors regret that in consequence of the great advance in the cost of labour, coal, and other material, they have been compelled to raise the price of gas from 3s. 9d. to 4s. per 1000 cubic feet.

1.—CAPITAL: *State of the Account at the End of the Six Months ending June* 30, 1872.

Statute, or Authority, under which raised.	Description of Capital.	Total Paid-up Capital.
Commercial Gas Act, 15 & 16 Vic., c. 155.	Stock.	£437,247 15s.

2.—REVENUE: *Account during the Six Months ending June* 30, 1872.

RECEIPT.				EXPENDITURE.			
Sale of gas—				Management—			
At 3s. 9d. per 1000 feet	£63,561 13 3			Directors allowances	£750 0 0		
Public lighting and contracts	7,828 8 3			Salaries of secretary and clerks	1,772 17 4		
		£71,390 1 6		Collectors commission and pay	903 2 5		
Sale of residual products—				Rent, rates, and taxes of offices	50 0 0		
Coke	11,954 18 11			Stationery, printing, and general charges	727 14 11		
Breeze	39 1 5			Payment to auditors	75 0 0		
Tar	1,259 19 4					£4,278 14 8	
Ammoniacal liquor	2,719 16 2			Manufacture of gas—			
		15,973 15 10		Coals, including carriage, dues, &c.	37,064 17 2		
Miscellaneous receipts		448 0 8		Purifying materials	880 4 6		
				Supervision and labour	11,779 17 2		
				Ordinary repair and maintenance of premises	2,005 16 3		
				Rents, rates, and taxes of manufactory	2,346 8 8		
						54,077 3 0	
				Distribution, including service mains, pipes, &c.—			
				Ordinary repair and maintenance		5,135 6 9	
				Meters—			
				Restoring and replacing		460 0 10	
				Balance for shareholders profit		23,860 12 0	
		£87,811 18 0				£87,811 18 0	

Balance of shareholders profit, as above	£23,860 12 0	
Required for dividend	21,862 7 9	
Balance	£1,998 4 3	

Reserve-fund, £39,799 6s. 2d.

The CHAIRMAN: And now, gentlemen, in moving that the report be adopted and entered on the minutes, it is my pleasing duty once more to congratulate you on the continued prosperity of the company. During the last half year we have certainly had difficulties to contend with in the way of increased expenditure for wages and material, but we are still enabled to bring over an amount which will give you a dividend of 5 per cent. for the half year, and leave a surplus of about £2000 to carry forward. I think under all the circumstances you will consider this a most satisfactory result. This has been done at the price of 3s. 9d. I am very glad also to say that our works are in excellent order. We stated to you on the last occasion that we were intending to fix machinery to facilitate the unloading of coal. I am happy to say that that machinery is very nearly completed. Our large leading mains in the district will very shortly be also finished. All this would have been done before had it not been for the great difficulty of obtaining iron. No one can tell what have been the indefatigable exertions of our engineer in writing urging the contractors to deliver the iron, and it is only within the last month or two that we have really had sufficient to go on continuously. However, we hope it will all be completed in a very short time, and I have not the slightest doubt that we shall derive much benefit from it. We have disposed of our secondary products in a satisfactory manner. We have entered into an excellent contract for the sale of our ammoniacal liquor, for which we have received between £2000 and £3000 in the half year. Our gas has been delivered at 14-candles illuminating power, being two candles above the parliamentary requirement of the Act of 1860. I need, therefore, scarcely say we have had no complaint from our consumers. Gentlemen, this is the bright side of the picture, and were I to conclude there it would give me much pleasure. But I must refer to the third paragraph in our report, in which we state that in consequence of difficulties that have arisen, we have been compelled to increase the price of our gas. Coal has increased in price 60 per cent., iron 50 per cent., and wages 13 per cent., and I am sorry to say the latter is after an increase we gave last year. There is a union among the men employed at the different gas-works, and labour strives to dictate to capital what it will receive. Under these circumstances, I think you will say that we have been very moderate in merely increasing the price of our gas 3d. It will be something towards making up your dividend next half year; but still with all that, and with all the economy and care that we shall take, with any rise there may be in secondary products, I am afraid that there may be something still to take from our reserve-fund. We live, however, in hopes of better times, and if we have to borrow at present from our reserve, when the normal state of things returns we shall be enabled to restore it again. We will not look gloomily forward because the future looks a little dark, for the heaviest clouds may pass away, and at the end of the half year we may meet again with smiling faces. The chairman concluded by moving the formal resolution for the adoption of the report.

The resolution was seconded by an honourable proprietor, and, no question arising upon the report, the resolution was unanimously adopted.

The CHAIRMAN then moved—"That, pursuant to the recommendation of the board of directors, a dividend of 5 per cent. for the half year ending June 30 last, less income-tax, be declared, and that cheques be forwarded to the shareholders on Monday next."

Mr. BRUSHFIELD seconded the resolution, which was carried *nem. con.*

The CHAIRMAN: I believe I have come to the end of all my resolutions, but, before we part, I think you should pass a resolution of thanks, not quite as an ordinary one, to our engineer, for his exertions in our behalf during the whole of the last half year. He is quite one with us, and I am sure exerts himself to the utmost of his skill and abilities in your service. I will, therefore, propose that the thanks of this meeting be given to the engineer for his indefatigable exertions on behalf of the company.

Mr. BRUSHFIELD: I do not think it is possible to make a wiser proposition than that. No man, wherever he may be, deserves the thanks of a company whom he serves more than our friend Mr. Jones. He stands in the highest position in the estimation of the whole gas community, and as far as we are concerned as a company, it is impossible to express ourselves too warmly in thanking him for his attention to our interests amid the very trying circumstances with which he has had to contend.

The resolution was unanimously adopted.

Mr. JONES having in suitable terms acknowledged the compliment paid him, votes of thanks were passed to the auditors, the secretary, and officers of the company, and to the chairman and the board of directors.

The proceedings then terminated.

GAS SUPPLY OF BURSLEM.—The annual meeting of the Burslem Local Board of Health was held on Wednesday, the 18th ult.—Mr. Woodall, chief bailiff, in the chair. Mr. Blackshaw, the gas examiner, presented the following report:—

As gas examiner to your board I have the honour to submit to you my second report. The illuminating power of the gas has, on the whole, been satisfactory; only on two occasions was it below the requirements of the Burslem Gas Act. The average for the year was equal to 14·67 candles, the minimum being 11·34, and the maximum 17·02 candles. During the first eight months of the year sulphur compounds (other than sulphuretted hydrogen) were greatly in excess; the average amount of sulphur during that time being equal to 48·57 grains per 100 cubic feet of gas, ranging from 18·52 to 85·97 grains. In consequence of this continued excess, your board made frequent complaints to the directors of the gas company, and in December last the latter body requested the Gas Committee of the board to meet them at their works for a conference on the matter. At this meeting the directors frankly offered to call in Dr. Odling to report generally upon the gas and its manufacture, and to make suggestions for getting rid of the superabundant sulphur. After a considerable lapse of time the doctor presented a very elaborate report; and in accepting that report your board expressed their earnest hope that the measures to be taken by the gas company, as the result of the inquiry and Dr. Odling's suggestions, would result in a considerable reduction of the impurities in the gas. About the same time that Dr. Odling sent in his report the gas referees (appointed under the Metropolitan Gas Act, mainly, I believe, for the purpose of investigating the sulphur question) issued their second report on this subject, which recommended a method of purification almost identical with that suggested to the Burslem Gas Company by the doctor. At that time I expressed to the board my opinion that in a short time the maximum amount of sulphur would be reduced to 25 grains, and probably to a less amount. I am happy to report that during the last four months the maximum amount was reduced to 26·32 grains, the minimum being 11·5, and the average 16·89 grains to each 100 cubic feet of gas. I hope when the details of the process of purification now employed are perfected, the amount of sulphur will be still further reduced. Sulphuretted hydrogen has been invariably absent, and the amount of ammonia less than one-fifth of the maximum allowed. In conclusion, I beg to inform the board that I have put up a complete photometric apparatus in my laboratory; and I may also observe that I have been directed by the gas company to procure the improved sulphur-testing apparatus recommended by the referees.

The chief bailiff, in reviewing the events of his official year, reverted to a reported remark in which he was made to express a wish for the supply of gas being in the hands of the local board, and stated that in 1857, when the gas company's bill was before Parliament, it contained clauses providing for the transfer of the works to the board, but they were struck out by the committee on the ground (the only one which could be ascertained) that no such powers had been given to a town not incorporated. He remarked that when at Rochdale recently he, with other gentlemen, was shown through one of the most magnificent halls in England, which had been erected without the cost of sixpence to the ratepayers out of the profits of the gas supplied to the town. He commended this subject to the consideration of the Finance Committee which would be appointed by the new board.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the London Tavern, on Thursday, Sept. 26—Professor ERASMUS WILSON, F.R.S., in the chair.

The SECRETARY (Mr. Magnus Ohren) read the notice convening the meeting, and the seal of the company having been affixed to the register of shareholders, the following report and statements of account were presented:—

The directors have to report that the business and progress of the company have under existing circumstances been satisfactory during the half year.

The price of coal, iron, labour, and all materials connected with the manufacture of gas, have largely increased in price; the residual products, on the other hand, by comparison with the corresponding half year, have been less.

The reports of the chemical adviser of the company, and of the medical officers of the parishes supplied by the company, on the purity and illuminating power of the gas, continue to be satisfactory. During the half year, 27 visits have been made to the works (without notice) by Dr. Letheby on the part of the company, and Dr. M'Cormack and Dr. Bernays on behalf of the parishes of Lambeth and Croyden respectively; and the average result of these examinations has given an illuminating power of 14·88 standard sperm candles.

The telescoping of No. 4 gasholder is completed, and will afford an additional storeage of 500,000 cubic feet.

The balance-sheet for the half year to the 31st of December last—appended to this report—shows the financial position of the company. The profit for the half year is £6577 3s. 3d., which, together with £80 5s. 11d., the unappropriated profit of the preceding half year, makes the available balance £6657 9s. 2d. Out of this sum the directors recommend the declaration of a dividend at the rate of 6 per cent. per annum on the preference capital; a dividend at the rate of 7 per cent. per annum on the ordinary 7 per cent. capital; and a dividend at the rate of 10 per cent. per annum on the original capital, all free of income-tax; and that the balance of £63 2s. 10d. be carried forward to the profit of the succeeding half year.

They also recommend that £1900 be written off preliminary expenses out of contingent-fund, thus closing the preliminary expenses account.

Profit and Loss, Half Year ending June 30, 1872.

Dr.		*Cr.*	
To Amount of coals carbonized	£12,607 1 9	By Private rental, Lady-day quarter	£13,931 6 6
Lime, oxide, and labour	129 9 6	Public ditto, ditto	1,387 3 8
Trade charges	1,402 16 2	Private rental, Midsummer quarter	7,534 18 5
Mains renewal account	165 16 11	Public ditto, ditto	1,257 11 8
Works renewal ditto	1,555 11 3		£24,111 0 3
Meters renewal and repairs account	511 11 11	Meter-rental	433 1 2
Rent, rates, and taxes	979 10 5	Coke made for sale	£4,367 17 6
Directors and auditors fees	530 0 0	Breeze ditto	131 19 5
Salaries and collectors commission	1,509 14 8	Tar ditto	283 18 8
Wages	3,150 14 10	Sundries	241 11 9
Interest on loans	213 0 0		5,025 7 4
Bad debts and allowances on collection	168 17 6	Ammoniacal liquor and sulphate of ammonia	601 6 7
Law charges	119 7 2		
Retort account	250 0 0		
Contingent-fund	300 0 0		
Profit	6,577 3 3		
	£30,170 15 4		£30,170 15 4

Balance-Sheet, June 30, 1872.

Dr.			*Cr.*	
To Proprietors for paid-up capital—			By Amount for plant, &c.	£174,200 3 0
5000 preference shares, at £10 per share		£50,000 0 0	Freehold land	8,886 17 8
5000 original shares, at £10 per share		50,000 0 0	Preliminary expenses	1,900 0 0
10,000 ordinary 7 per cent. shares, at £10 per share	£100,000 0 0		Retort account	741 4 5
Less amount uncalled	24,687 0 0		Stock on hand	11,690 6 1
		75,313 0 0	Amount due from sundry persons	1,339 18 1
Loans on debenture		8,355 0 0	Invested in Consols from contingent-fund	134 14 1
Amount due to sundry persons		9,839 12 11	Private gas and meter rental, Midsummer quarter	7,489 10 1
Contingent-fund—			Arrears	215 8 3
Uninvested	£9,778 11 11		Public rental, Midsummer quarter	1,257 11 3
Invested	134 14 0		Fittings	65 19 1
Appropriated from profit and loss for contingent-fund	300 0 0		Balance at bankers	2,456 14 2
		10,213 5 11		
Profit unappropriated		80 5 11		
Profit and loss		6,577 3 3		
		£210,378 8 0		£210,378 8 0

Appropriation of Balance.

Balance brought forward from last account	£80 5 11	Dividend on preference share capital, at 6 per cent.	£1,500 0 0
Ditto of profit and loss	6,577 3 3	Ditto on ordinary 7 per cent. capital, at 7 per cent.	2,594 6 4
		Ditto on original share capital, at 10 per cent.	2,500 0 0
			£6,594 6 4
		Balance to be carried to next account	63 2 10
	£6,657 9 2		£6,657 9 2
		Preliminary expenses, to be written off	1,900 0 0

The CHAIRMAN: Gentlemen, it has been our custom for a series of years to pride ourselves upon our gradual progressive development, and upon our ability from time to time to reduce the price of gas to our consumers. I regret to say that, although some months ago it was in contemplation to announce a further reduction to our shareholders, we are unable to do so upon the present occasion. But, although unable to reduce the price, we are happy to inform you that, notwithstanding the pressure upon gas companies generally has been very great, from causes with which you are perfectly acquainted, we are enabled by constant care and economy to retain the existing price without any alteration. In these times, however, such an announcement as this applies only to the present moment, because we cannot foresee the course of things during the next few months; nevertheless, we do sincerely hope that within that period we may witness the correction of that aberration of social economy which is at the bottom of the present increased price of coal, and which has been the means of putting gas companies into a position of considerable difficulty. We trust that the increased price of coal may lead possibly to an enlarged demand for gas—a greater consumption of gas—but in any case we feel that by giving our attention to the interests of the consumers, we are placing ourselves in the best position to urge an increased price, should circumstances at any time render it necessary. We feel that our consumers will appreciate our forbearance; and it is evident that they will, for they will have no opportunity of saying that we seized upon the first opportunity to raise the existing price. In reading over the report just presented, there are one or two matters which will strike your attention, especially the paragraph which refers to the enlargement of one of our chief gasholders, by means of a lift, which will enable us to store away an additional 500,000 cubic feet beyond what we have been able to do up to the present moment. I am happy to inform you that this extension of our storeage, which is a matter only spoken of hitherto as a thing in progress, is now completed, and the new telescopic gasholder is at this time filled with gas, and working in a most excellent manner. The fact of our being obliged to telescope one of our chief gasholders shows that we are not idle, so far as the interests of our consumers are concerned; that it is the increased demand on the part of the consumers which rendered it necessary to make this increase to our plant. Had it not been for the circumstance to which I have referred, a circumstance over which we have no control, and which has cast a kind of shadow over us—for we are all fellow-sufferers by it in whatever position we occupy in society at the present moment—our report to you on this occasion would have been much more satisfactory than it is. Nevertheless, you will perceive by the last paragraph that we have thought it desirable to clear off one of those impediments which have been referred to more than once in this room as being desirable to be removed from our accounts—viz., the item for preliminary expenses, which we have done by writing off £1900 out of the contingent-fund. There is one point with respect to this company in which we have never failed, and that is in maintaining the standard of purity and illuminating power of our gas. As you know, by Act of Parliament we are bound to supply gas of an illuminating power equal to 12 standard sperm candles; but, in every report we have made to you, we have been enabled to say that illuminating power has been exceeded, and upon the present occasion we inform you that the average results of examinations during the last six months give an illuminating power of nearly 15 candles. Under these circumstances, which we may consider to represent a really favourable position and state of things, I have much pleasure in moving—"That the report of the directors and the balance-sheet confirmed by the auditors be received, adopted, and entered on the minutes."

Mr. J. B. PADDON: I beg leave to second the motion, and I do so with much pleasure, for, in looking at the accounts, I see satisfactory evidence of great administrative skill and care in the management of the company. Since the corresponding period of last year, I observe that our capital has been increased by a sum of £4300, and there are two satisfactory features in connexion with that increase; the first is that, judging from the terms of the report, some provision has been made for the future necessities of the company, and the second is that this provision has been made without at all disturbing the relations between income and capital. If anything, it is rather in favour of the former, because there is such an increase in the rental as fully to justify the outlay which has been incurred. Coming to revenue, I find also that, putting aside the question of coal and residual products as matters which none of us have much influence upon, strenuous efforts are being made to bear up against these things, and that the working expenses of the company have been reduced nearly 2d. per 1000 cubic feet of gas. And it is important, in connexion with this company, accustomed as we are to see such economies carried out, to notice this fact, because it represents much more than it would do in some companies. Another thing I would remark, and that is that notwithstanding all the difficulties the board have had to bear up against they have managed to write off £1900 from the accounts for preliminary expenses. Perhaps that might not strike every one as it strikes me; it is, as a matter of fact, that we are taking £1900 which was invested in lawyers bills and such things, and converting it into something which, from the present time, will earn profits, which, I think, is a very satisfactory circumstance indeed.

A PROPRIETOR: This £1900 is taken from the contingent-fund, so that we are exactly where we were. It is a mere alteration of figures.

Mr. PADDON: Not exactly. The £1900 was the balance of the preliminary expenses. It is now taken out of the profits of the company, and will be invested in mains, retorts, or gasholders, which will earn profits for the future.

Mr. H. P. STEPHENSON (deputy-chairman): It is £1900 taken out of the profits of previous years.

The PROPRIETOR: It does not make us £1900 better off.

Mr. STEPHENSON: No; but it gets rid of that item from your balance-sheet which was looked upon as an asset, but really was no asset at all.

The motion was put and carried unanimously.

Mr. STEPHENSON moved—"That a dividend at the rate of 6 per cent. per annum on the preference capital, a dividend at the rate of 7 per cent. per annum on the ordinary 7 per cent. capital, and a dividend at the rate of 10 per cent. per annum on the original capital, all free of income-tax, be now declared, and made payable forthwith, and that £1900 be written off preliminary expenses out of contingent-fund, thus closing the preliminary expenses account."

Mr. C. AIRD seconded the motion, which was carried unanimously.

Mr. WEBB moved—"That the thanks of this meeting be given to the directors for their able management of the affairs of the company for the past half year."

Mr. BENGOUGH seconded the resolution, which was cordially adopted.

The CHAIRMAN acknowledged the vote, and proposed—"That the thanks of this meeting be given to the auditors and officers of the company for the efficient discharge of their duty." In doing so he referred to the long connexion of the secretary with the company, and said that Mr. Ohren's services were well known to all the shareholders. He also passed a high eulogium upon the company's present engineer, Mr. James Watson, under whose care he said the general working of affairs had considerably improved, and whose skill and ability, in connexion with the alterations and capping of the large gasholder, the directors duly appreciated.

Mr. STEPHENSON seconded the motion, which was carried unanimously.

Mr. J. GLAISHER, one of the auditors, acknowledged the vote.

Thanks were then voted to the chairman, and the proceedings terminated.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

An Ordinary Meeting of the Proprietors of this Company was held at the London Tavern, on Tuesday, Oct. 1—THOMAS BRIDGE SIMPSON, Esq., in the chair.

The SECRETARY (Mr. G. Livesey) read the advertisement convening the meeting, the minutes of the last general and special meetings, and the following report of the directors for the half year ending June 30 last:—

The directors have again the pleasure of submitting to the proprietors a favourable report.

The unprecedented rise in the price of coal, iron, and labour, during the present year, has not been without its effect on gas companies generally, as has been shown by the large increase in the charge for gas already made in so many different parts of the country; but this company having an accumulated amount of surplus profits standing to the credit of the revenue account, your directors were enabled to give to the consumers the benefit of a reduction in price.

From the commencement of this year gas has been supplied by this company at the low rate of 3s. per 1000 cubic feet. It was fully expected that at this rate the profit on the half year's working would fall short of the sum required for the usual dividend.

It is satisfactory, however, to find that, even with the increased expenses, the net amount earned in the half year is but £734 less than that needed for the dividend.

Your directors think it right to mention that the question of the further purification of gas now brought so prominently before the public is receiving the unremitting attention of your board and of its officers.

In reference to the works in hand your directors have to report that the tank (152 feet diameter by 38 feet deep) for the new gasholder is nearly completed. By the advice of the company's engineer, concrete has been chiefly employed in its construction, by which means the quantity of brickwork has been greatly reduced and a large saving in cost effected. It is satisfactory to find that other companies are now adopting this plan of constructing tanks for gasholders.

The rental for gas and the receipts for products for the half year to June, 1872, amount to £63,745 9s. 3d., and the expenditure for the same period to £49,479 12s. 6d., leaving a balance of £14,265 16s. 9d., which, with £734 3s. 3d. to be taken from the surplus of previous years above referred to, will be appropriated to the payment of the usual dividend.

The following statements of account were taken as read:

Capital Account, for the Half Year to June 30, 1872.

	Expended to Dec. 31, 1871.	Expended this Half Year.	Total expended to June 30, 1872.
	£ s. d.	£ s. d.	£ s. d.
To Amount expended to Dec. 31, 1871	268,908 8 10	..	268,908 8 10
Manufacturing plant	..	5,476 15 11	5,476 15 11
New meters and fixing	..	325 19 6	325 19 6
New mains and laying	..	1,115 5 6	1,115 5 6
Sundries	..	395 19 2	395 19 2
Balance	..	..	23,777 11 1
	£268,908 8 10	£7314 0 1	£300,000 0 0

	Certified to Dec. 31, 1871.	Received this Half Year.	Total to June 30, 1872.
	£ s. d.	£ s. d.	£ s. d.
By Shares, at £50 each	200,000 0 0	..	200,000 0 0
do., at £12 10s. each	50,000 0 0	..	50,000 0 0
do., at £12 10s. each, £2 10s. paid	50,000 0 0	..	50,000 0 0
	£300,000 0 0	..	£300,000 0 0

Balance-Sheet, June 30, 1872.

Dr.		*Cr.*	
To Balance of capital	£23,777 11 1	By Consols, reserve-fund	£20,000 0 0
Reserve-fund	20,000 0 0	Do., renewal-fund	8,599 10 7
Renewal-fund	8,599 10 7	New Three per Cents.	13,781 5 0
Profit and loss account	31,816 8 3	Cash at bankers	17,215 7 4
Sundry creditors	4,555 15 10	Do. in hand, for freight accounts, &c.	600 0 0
Deposits	1,962 13 2	Stocks—	
Property-tax account	17 2 0	Coals	6,759 1 5
Dividend account	324 3 9	Coke and breeze	100 0 0
		Tar and liquor	238 10 0
		Mains and meters	2,520 2 9
		Amount due for—	
		Gas	19,515 10 11
		Products	1,188 10 7
		Sundries	218 10 7
		Interest	316 15 6
	£91,053 4 8		£91,053 4 8

Revenue Account, June 30, 1872.

Dr.		*Cr.*	
To Coals	£25,846 5 3	By Gas at 3s. per 1000 feet	£42,272 13 5
Purifying material, &c.	184 6 7	Public lighting	6,379 11 3
Salaries, engineer, &c.	781 18 0	Coke, less labour loading	10,296 17 2
Wages	6,631 19 11	Breeze	221 9 3
Repairs and maintenance less old material sold	2,212 19 11	Tar	1,343 4 0
Repair and renewal of mains, &c.	2,367 12 11	Liquor	2,365 2 6
Salary of clerks and inspectors	1,133 7 0	Rents	205 0 6
Repairing and renewing meters	920 15 3	Transfer fees	3 12 6
Lighting and repairing lamps	1,546 13 8	Other items	657 18 8
Rent	378 7 7		
Rates and taxes	2,731 0 11		
Directors	600 0 0		
Auditors	50 0 0		
Salary, secretary, &c.	915 0 0		
Collectors commission	922 15 8		
Stationery and printing	122 7 7		
General charges	462 11 9		
Superannuation-fund	75 12 0		
Gas referees, auditors, &c.	96 7 7		
Bad debts and allowance	414 5 3		
Law and parliamentary charges	1,085 5 8		
Balance	14,265 16 9		
	£63,745 9 3		£63,745 9 3

The CHAIRMAN: Gentlemen, having heard the report of the directors, you are in possession of all the information respecting the company which it is in our power to give you, and I have, therefore, very few remarks to make in moving its adoption. There is one subject which during the last half year has attracted very much of the public attention, and has been the source of great anxiety to all persons connected with gas manufacture—I mean the high price of coals. I am happy to inform you that we were relieved of much of that anxiety as far as this company is concerned, from the fact that we are protected by contracts until next spring. I trust that, between the present time and the period when our contracts will expire, a great alteration may take place in the coal trade, and I think even now we see some little signs of a decline in existing rates. If this expectation should be realized, we shall be able to maintain our position as regards the price at which we supply gas to our consumers. The high price of iron is also a very important consideration for gas companies, and of course tends to diminish profits. With regard to the last reduction we made in the price of gas, some of our proprietors may think, perhaps, that we did wrong in taking that step; but you must remember that we had a surplus of revenue in hand, which was only applicable to that purpose, and we had at the time every idea that there would be a large increase in the gas-rental. It is very satisfactory to find that although the reduction of price made a difference of nearly £3000, and in addition to this a large extra cost of coals, and though the item of parliamentary expenses in the accounts amounts to above £1000, we are only deficient on this occasion some £700 of the sum required to pay our maximum dividend. We have a surplus out of which we can take that sum. I think, therefore, the proprietors of the company may congratulate themselves upon the position in which we stand. I believe we are almost unrivalled in this respect. There is one question to which attention has has been a good deal attracted of late, but it is one rather for the directors than the proprietors, and that is the question of sulphur in gas. I believe, though the subject is a troublesome one for us to deal with, the question of sulphur in gas is of very little importance to the public. With regard to the state of our works, I may say that they are in a most admirable condition. Everything is exactly as we could wish it; the whole establishment is in excellent working order, and I do not know that there is anything at the present moment which need give us any anxiety, except it be the price of coal, so that I think we may fairly congratulate every one connected with the company. I shall be happy to answer any question that may be put to me, and I now move—"That the report and accounts be received and entered on the minutes."

Mr. GRAY: It has been my practice on former occasions to make some observations in reference to the working of this company. I think I may say, with the most perfect propriety, that at no meeting of the proprietors have I ever felt a greater desire to express my approval of the conduct of the directors in the management of our affairs than at the present time. The accounts submitted are highly satisfactory, the more so when we remember that many gas companies have been under the necessity to advance the price of gas owing to the rise which has taken place in the value of coal, iron, and labour. Notwithstanding these things, this company have continued to supply gas to their consumers at the price to which it was recently reduced—viz., 3s. per 1000 cubic feet. My own opinion is that coals and iron cannot continue long at their present prices, which I can only regard as the result of an unscrupulous combination on the part of the colowners and the ironmasters. I certainly trust that at no distant time the price of coal will be considerably reduced, and in fact, I have no doubt it will be. When we refer to parliamentary papers we find that last year the export of coals amounted to 12 millions of tons. Why did not the Government, when the price was raised artificially, inflicting as it did great injury upon the working classes, impose a prohibition on the export of coals? Suppose such an advance to take place in the price of wheat, the Government would be called upon to prevent its exportation, and to the poor man coal is nearly as essential to his comfort as corn. I will only again express my satisfaction with the position of this company, and the way in which its affairs are conducted, and conclude by seconding the motion.

The resolution was put, and carried unanimously.

Mr. PAULL moved—"That a dividend at the rate of 10 per cent. per annum be now declared for the half year ending June 30 last, payable on the 4th inst., and that the warrants be transmitted to the proprietors by post." As one of the auditors of the company, he might say that his investigation of the accounts had been perfectly satisfactory, and that the results of the working of the company fully justified the payment of the dividend.

Mr. HARRIS seconded the resolution, which was put, and carried unanimously.

Mr. GRAY said, before the meeting separated, he was desirous to make one or two observations. He need not remind the proprietors that for many years past the two offices of engineer and secretary had been held by the same person. He (Mr. Gray) never liked the arrangement himself, and he knew that the effect was to throw a very heavy amount of labour on the late Mr. Livesey, in allusion to whom he would say that no terms he could employ would adequately express his sense of the ability and energy displayed by his late friend in the discharge of every duty he undertook. Since Mr. Livesey's decease, the two offices had been filled by his son, but he (Mr. Gray) was satisfied that all the time and energies of Mr. George Livesey were required for the very responsible duty of engineer of the company, and that he ought not to be called upon to undertake anything else. He, therefore, hoped the directors would take into their serious consideration the propriety, at no distant date, of disassociating the two offices.

The CHAIRMAN thought it would be better that the proprietors should leave the matter with the directors for a time. It had already occupied their attention.

Mr. MALTBY said he thought in the present prosperous condition of the company it would be unwise to make any change in the direction indicated. The present prosperity was due in a very large measure to the late Mr. Livesey, and he might say, from some knowledge of Mr. George Livesey, that, of late years, he took almost the entire management out of his father's hands. Having watched Mr. G. Livesey's conduct for a long time, and knowing how capable he was to discharge the duties he had undertaken, he felt sure it would be an imprudent thing to make a change.

The CHAIRMAN again remarked that the subject had fully occupied the directors attention, and he thought it had better be left.

Mr. RUSHTON thought it was a strange thing that Mr. Gray should introduce a subject which it was properly the province of the directors to attend to. If there were any reason to suppose that the duties of the double office were inefficiently performed, it must be better known to the board than to the proprietors.

Mr. GRAY said he had stated most unequivocally that the duties were efficiently discharged.

Mr. RUSHTON had no doubt the subject was introduced by Mr. Gray out of kindness to Mr. Livesey, but it appeared to be rather left-handed kindness. He wished it to be understood that the shareholders generally did not participate in the views that had been expressed by Mr. Gray.

Mr. GRAY said a wrong interpretation had been put upon his remarks. He never presumed to dictate to the directors the course which they ought to take, neither had he had any communication with Mr. Livesey on the subject.

Mr. JENKINS submitted that this was a matter with which the directors had nothing, as a board, to do. The Act of Parliament was very careful to declare that the appointment and the remuneration of the secretary should be determined by the general body of shareholders. In the event of misconduct the directors had power to suspend the secretary or the treasurer, but even then they were bound forthwith to call an extraordinary meeting of the company for the purpose of taking into consideration the propriety of removing such an officer from his post and to elect a new one. The marginal note to section 4 of the Act read, "Powers of the company not to be exercised by the directors," and the section itself provided that the selection and removal of this officer should be exercised only at a general meeting of the company. At the meeting of the shareholders held in November last, shortly after the late Mr. Livesey's death, a resolution which had been come to by the board on the subject was read. After referring in suitable terms to the services rendered by Mr. Livesey, the resolution concluded thus—"That to mark the sense this board entertains of his services, and the high opinion it holds of the merits and qualifications of his son, it will be prepared to recommend to the proprietors the appointment of Mr. George Livesey to the vacant office of secretary." The directors also, in their report,

stated that in pursuance of this resolution they had appointed Mr. G. Livesey to the double office.

The CHAIRMAN: *Pro tem.*

Mr. JENKINS said there was nothing in the resolution passed by the board to lead any one to suppose the appointment was of a temporary character, and the chairman, in his introductory remarks, suggested that Mr. Livesey should be appointed to the office of secretary as well as that of engineer, partly out of consideration to his great merits and partly from the fact that he was well acquainted with the duties of the former office, having acted as secretary during his father's temporary absence. The chairman said that, in his opinion, with a slight increase of salary, together with some assistance in the office, Mr. G. Livesey would be able to perform the duties of the two appointments. At that time he (Mr. Jenkins) differed with the directors, and the majority of the meeting agreed with him, but the salary was fixed at the low sum at which it now stood.

The CHAIRMAN said the honourable proprietor ought to understand that within a few months previous to that time Mr. G. Livesey's salary had been raised from £700 to £900.

Mr. JENKINS said the report of the proceedings of the meeting, from which he was quoting, fully bore out the remark he now made, that at the time Mr. G. Livesey was appointed secretary, he was in the enjoyment of an income of £900 a year from his duties as engineer, and that the only addition made to his remuneration when he became secretary also was £100 year. It struck him (Mr. Jenkins) at the time as a very inadequate salary for a person occupying such a responsible position in a large establishment like this, and he then ventured to propose that the remuneration should be £1200. With regard to the association of the two offices, it appeared to him that it did not lie in the mouth of Mr. Gray to raise an objection on the present occasion after the remarks he made at the meeting referred to. There was no allegation against Mr. Livesey that he did not or could not discharge the duties of the two. On the contrary, the chairman in moving the report expressly bore testimony to the efficiency with which those duties were performed when he said that the whole of the establishment was in the best working order. If, therefore, it was intended to supersede Mr. Livesey in either office, the proprietors ought to be told the reasons for so doing.

The CHAIRMAN said it seemed to him as though the honourable proprietor was rather making a charge against the directors. At the time Mr. Livesey's salary was fixed at its present amount, that gentleman expressed himself satisfied. There had always been a good feeling between the board and the proprietors, and he regretted that this matter should have caused any dissension. At the same time he would say that he should not oppose any wish which the meeting had in reference to it. Mr. Livesey's father held both appointments, and he (the chairman) endeavoured to persuade him, seeing that his health was failing and that he was wearing himself out, give the engineering department into the hands of Mr. G. Livesey.

Mr. HILL (a director) maintained that the prosperity of the South Metropolitan Gas Company was chiefly due to the one-handed management of past years, and that if the offices of secretary and engineer were now separated, and there was a want of harmony between the persons filling them, it would seriously interfere with the future well-being of the undertaking. If Mr. Livesey was not the man to be the head of the concern, then let some one else be chosen in whom the proprietors could have confidence; but do not let them attempt, by electing some one to take part of his duties either as secretary or as engineer, to relieve him of the sole responsibility and control of this great and successful company. He (Mr. Hill) would never be a party to anything of that sort. There could be no question that as an engineer Mr. Livesey stood very high in his profession, and the experience he had had in the conduct of this company's affairs pointed him out as the most proper person to be at the head of its administration. By all means let them have united management. If the work of the secretary's office was too much for Mr. Livesey to attend to, let him have an assistant secretary—a person well accustomed to the business of a gas company—who would relieve him of the drudgery of correspondence; and if further help were needed in the engineering department, let it be obtained, but he would urge them not to take the responsibility of the whole concern off Mr. Livesey's shoulders.

Mr. JENKINS said he entirely concurred in the remarks just made by a member of the board, and he should propose a resolution to the effect that Mr. Livesey be continued in the office of secretary of the company, that it be recommended to the directors to continue him in the office of engineer which he already held, and that his salary as secretary be £1200 a year.

Mr. GRAY said he did not wish to prolong the discussion, but as his remarks had been so much misunderstood, he must say a word. It seemed to be assumed that he was dissatisfied with Mr. Livesey. Quite the contrary. All he said was, that his duties in the double office were more than he could attend to, and therefore the suggestion was made that the directors should take the matter into consideration, and recommend to the proprietors such a course as would relieve him of a part of his labours. With regard to the question of remuneration, he fully concurred in Mr. Jenkins's remarks that an adequate salary should be given to an efficient officer.

Mr. FOSTER thought as Mr. Livesey was present it would be well to ask him whether he found his duties more than he could properly attend to, and whether he would rather resign one of his appointments; also whether he had sufficient assistance in the office. He (Mr. Foster) must say that, when in November last it was agreed that Mr. Livesey should hold the two offices, it did strike him that the increase of £100 a year upon his salary for the one office was not sufficient, considering the increased labour to be imposed upon him.

Mr. PAULL felt that the proprietors were travelling a little beyond their duty. They had a body of directors who for many years had conducted successfully the affairs of the company—gentlemen who deservedly enjoyed their confidence—and he thought the matter should be left in their hands. The directors stated, on the occasion of the death of the late secretary and engineer, that they recommended Mr. G. Livesey's appointment to the joint offices as a provisional arrangement, and therefore he (Mr. Paull) was somewhat surprised that they had not to-day alluded to the subject. They had not done so, no doubt, for wise reasons, which it would not be desirable for the meeting to inquire into. The chairman had, however, stated that the board had the matter under consideration, and probably at the next meeting they would be prepared to say what course it would be proper to take. He regretted, therefore, that anything should be said which was likely to disturb the harmony so long existing in the company. He was not about to enter into the question of the merits of Mr. Livesey, though he might say that, having, as one of the auditors, been brought frequently into communication with that gentleman, he had a very high opinion of his abilities. All he desired now to do was to urge the meeting to leave the matter for the present, and still to repose confidence in the directors, who he had no doubt would come to such a decision as would be thoroughly satisfactory. He was quite sure the proprietors would be prepared hereafter to make a suitable provision for Mr. Livesey, whether he held a joint or separate appointment.

Mr. LIVESEY said he desired to reply to the inquiry made by Mr. Foster. He felt that he was perfectly able to conduct the business of the company, and he wished to continue to do so. He had managed its affairs since the proprietors did him the honour to appoint him, practically without assistance, the only addition to the staff being a temporary clerk at £3 a week. He inherited a deficiency in the coal supply, and he had a very anxious time last winter from this circumstance, with the added labour arising out of the amalgamation arrangements. The drudgery of the business it was that wore out his father, and all that he (Mr. G. Livesey) needed was assistance to relieve him of that drudgery. As to the question of salary, he certainly did say last year, when it was settled, that he was satisfied; it would have been ungracious had he not done so; and he did not now wish to say anything to the contrary. But he might add that he did feel at the time the full force of what Mr. Jenkins remarked, that the £100 a year was a paltry addition to what he had been having. Still, having always received great kindness at the hands of the proprietors, he was content to leave the matter in their hands. All that he now wished was that he might not be kept for another six months in suspense as to his position, but might know definitely whether he was to have the double office or not.

Mr. PAULL doubted whether, without notice, any motion could be put to the meeting, and thought the matter might be safely left in the hands of the directors.

Mr. JENKINS said no notice of motion was required by the Act of Parliament, and he certainly sympathized in Mr. Livesey's desire that the matter should not be kept in suspense. He should therefore persevere with his motion, which was—"That Mr. Livesey be continued in the office of secretary at a salary of £1200 a year, to commence from the date of his appointment, and that the directors be recommended to continue him in the office of engineer at a nominal remuneration."

Mr. FOSTER seconded the motion.

Mr. Rev. M. R. SOUTHWELL said he should move as an amendment—"That this meeting desire to express their satisfaction at the manner in which the duty of joint secretary and engineer has been performed by Mr. G. Livesey, and recommend that he should be continued in the joint office at a salary of £1200 per annum." The appointment of engineer to the company rested not with the proprietors but with the board, and this would simply be a recommendation to them on the subject.

Mr. JENKINS said the amendment did not meet the case, because it only made a recommendation on the subject.

The amendment was then put to a show of hands, and lost, and the original motion, on being put, was carried unanimously.

Mr. LIVESEY said now that this unpleasant business was over, it was his duty to return his cordial thanks to the proprietors for the very kind and handsome way in which they had behaved towards him. He was very sorry that any division of feeling had occurred, and he was glad that the matter was settled, as he was relieved from a state of suspense, and could now go on and manage the affairs of the company without fear of interruption. His heart was in the work; he was very proud of the company, and would do all he could to maintain the prosperous condition into which, to a great extent, it had been brought by the exertions of his late lamented father.

Lord WM. LENNOX proposed a vote of thanks to the chairman and directors. Every one would agree with him that the chairman had acted with the greatest courtesy and consideration to the proprietors throughout the discussion which had just taken place, and would also join with him in the expression of a hope that, whatever differences of opinion there might have been, no unkindly feelings would be created. The directors had admirably conducted the business of the company, and were entitled to the utmost confidence of the proprietors.

Mr. GRAY, in seconding the motion, said he should be very sorry if any one supposed that the remarks made at this meeting emanated from a want of confidence in the board. The directors enjoyed the utmost confidence of the proprietors, who also felt that they had an able coadjutor in the engineer.

The motion was cordially adopted.

The CHAIRMAN said the directors were very much obliged for this mark of the approbation of the proprietors. They had exerted themselves in the interests of the company to the best of their ability, and should continue to do so in the hope of maintaining the present prosperous condition of affairs. At the same time he must say he regretted in many respects the little differences which had arisen that day. Now that the matter was settled, the directors would follow out the recommendations of the proprietors, their only desire being to have the business of the company well managed. So long as they enjoyed the confidence of the proprietors, there would be no effort wanting on their part to ensure that the business did not suffer in their hands.

The proceedings then terminated.

LIGHTING SHIPS WITH GAS.—Messrs. Porter and Co., of Lincoln, are at present engaged in erecting on board the *Celtic*, one of the steamers of the "White Star" line, plying between Liverpool and New York, the necessary apparatus for lighting that vessel with gas. It is intended to supply upwards of 300 lights, about 30 of which will be kept burning night and day, and the gas employed will be manufactured from oil. The apparatus consists of three sections—viz., retort-stack, washer, condenser, scrubber, and gasholder, the whole compact enough to be contained, including room for stoking and working, in a space of 1600 cubic feet, or 22 tons measurement space. The retort-stack has three retorts set over two furnaces, so that either one, two, or three retorts may be worked. The ovens and flues are so arranged as to secure the thorough heating of the whole exposed surface of the retorts, which are of peculiar shape, and the lids are provided with diaphragm pendants, that the oil issuing from the syphon feed-pipes must of necessity be distributed over the heated surface and volatilized instantaneously. The stack is provided with all requisite accessories, chains and pulleys for the dampers, foot and handrail, outlet for gas and draw off cocks for refuse. The brickwork is enclosed in cast-iron plates constructed to prevent radiation, and thus economize the heat, and the whole is so arranged that any part of the stack may be inspected, cleaned or renewed, without interfering with the other parts. The washers, &c., for the purification of the gas after it leaves the retorts, are provided with overflow pipes, so arranged that however heavily the ship may roll, the water is maintained at an uniform level. There are also feed-pipes for a supply of clean water when required. The holder is of novel construction, a combination of holder and tank, the usual water-tank being inadmissible on board ship; and this was one of the greatest difficulties that had to be surmounted. The holder passes so completely into the tank when empty, as to leave no waste space for gas which cannot be expelled, and, when full, holds double the quantity of gas usually contained in one of the ordinary construction—an important consideration on board ship, where every inch of space is valuable. Ready access is given to the interior, and all danger from explosion or unpleasant odour from leakage is avoided. An indicator is provided, by which the man in charge can ascertain in a moment the quantity of gas in the holder, and regulate the supply of oil to the retorts accordingly. On leaving the holder the gas passes through a governor, which regulates the flow, so as to give an uniform pressure at the burners, whether few or many are lighted. This regulator, and also the gasholder just described, are so constructed as not to be affected by the motion of the ship. Every precaution is taken against the possibility of danger from explosion; each section is insulated by iron bulkheads, and even every portion of each section is completely isolated by shut-off and by-pass valves, so that any one or more of them may be thrown out of use for inspection or cleaning without interfering with the working of the other parts. The gas produced is pure and brilliant; a jet burning 1½ to 2 cubic feet per hour giving a light equal to 11 or 12 wax candles. There are between 30 and 40 of these burners in the large saloon of the steamer, which will thus be as brilliantly lighted as any London ball-room. The character of the workmanship more resembles a piece of first-rate mechanism than an ordinary gas apparatus, while the convenience and comfort of this method of lighting ships at sea are so marked that its very general adoption may be confidently anticipated."

ALLIANCE AND DUBLIN CONSUMERS GAS COMPANY.

The Half-Yearly General Meeting of the Shareholders was held on Monday, Sept. 30, at the Company's Office, Grafton Street, Dublin—Mr. DENIS MOYLAN, D.L. (chairman of the board), presiding.

The SECRETARY (Mr. Stevenson) read the directors report and statement of accounts for the past half year, as follows:—

The directors herewith submit to the proprietors the statement of accounts for the half year ending the 30th of June last, and in doing so have to express their regret that, owing to certain exceptional circumstances connected with the outlay on the principal items of expenditure, the results are not as favourable as usual.

In coals, wages, iron—in short, for every material in use at our stations—the cost is largely in excess of the corresponding period of last year. On the other hand, it is gratifying to know that the income of the company is considerably beyond that of the period referred to, the increase from sales of gas and products amounting to more than £8000—a fact which shows, in the most satisfactory manner, that the business of the company continues steadily on the advance.

The directors need scarcely assure the proprietors that, in common with all mercantile and manufacturing undertakings largely dependent upon coal and labour, they have had difficulties of no ordinary character to contend against during the past six months; and although these difficulties have been met and successfully overcome, there is no disguising the fact that they have materially affected the profits of the company. The directors, however, hope that they have seen the worst of the present crisis, and have reason, they think, to anticipate that the future relations subsisting between employers and the employed will be of a more equitable and favourable character. Your directors are free to admit that the present extraordinary and unprecedented condition of the coal and labour market would be regarded with grave apprehension, but that they believe it will, to a considerable extent, be compensated for in the increased value of the secondary products, more especially of coke, which is now in active demand at all the company's stations.

The directors have just entered into a new contract for the sale of their tar, which will enhance the revenue derivable from that product, and they anticipate a large increase in the article of gas liquor, for the production of which new and more efficient appliances are now in course of erection at Brunswick Street station.

With respect to the works, the directors have the pleasure of reporting that on the completion of the present extensions, including a new retort-house to be served by machinery, the Brunswick Street station will bear favourable comparison with any in the United Kingdom; they may add that but for the difficulty of obtaining labour and materials—including iron castings and fire goods—the entire of this station would have been in active operation at the beginning of the present month.

The increasing demands of the important township of Rathmines have been met by the laying down of a 12-inch main throughout the entire roadway from Portobello Bridge to Roundtown, and from henceforward all cause of complaint from that locality will be removed. Similar steps have been taken to satisfy the requirements of the Dundrum district, which is now amply supplied, and to the perfect satisfaction of the residents.

The new Act, known as "The Dublin Gas Act, 1871," which provides for the substitution of 20-candle for 16-candle gas, came into operation on the 1st of July last, and the directors have reason to believe that its advantages are appreciated and acknowledged by the public.

The board regret having to report the death of a colleague in the person of Mr. James Brophy, who for many years usefully discharged the duties of a director. The board consider it more expedient not to fill up the vacancy, and the more especially as the omission will affect a reduction in the sum appropriated to the remuneration of the directors.

The directors now direct the attention of the shareholders to the profit and loss account, which, after taking the sum of £1481 12s. 10d. from the contingent-fund, presents a net balance of £12,982 10s., available for payment of a dividend at the rate of 6 per cent. per annum, such dividend being as usual free of income-tax.

Dr. *Balance-Sheet for the Half Year ending June 30, 1872.* *Cr.*

To Purchase of gas-works, and amount expended as per account, Dec. 31 last	£623,326	2	11	By Proprietors stock— Class A	£152,000	0	0
Expended this half year.	16,611	10	2	Class B	55,000	0	0
	£639,937	13	1	Class C, No. 1	135,000	0	0
Stores—stock on hands	5,949	11	7	Class C, No. 2	90,750	0	0
Coal ditto	29,829	9	0	Company's bonds at 4½ per cent.	147,500	0	0
Coke, breeze, and tar ditto	2,852	7	5	Contingent-fund	14,144	2	9
Petty cash on hands	11	8	9	Gain this half year	12,982	10	0
Due for gas and meter rent	37,887	12	1	Insurance-fund	331	2	2
Do. coke, breeze, and tar	4,721	9	11	Bills payable	15,612	17	11
Do. fittings	782	2	0	Debts due to sundry persons	102,382	8	1
Do. rent of fittings	64	4	5	Unclaimed dividends	1,836	1	7
Due by sundry persons (advanced on contracts, &c.)	7,653	2	3	Deposit account	2,149	18	0
	£729,689	0	6		£729,689	0	6

Abstract of Revenue and Expenditure for the Half Year ending June 30, 1872.

By Revenue derived from gas and meter rent	£72,212	3	1				
Sales of products	19,389	5	5				
Transfer fees	72	0	0				
				£91,673	8	6	
Amount taken from contingent account				1,481	12	10	
				£93,155	1	4	
To Coals carbonized	£47,197	9	8				
Wages	9,474	12	10				
Salaries—directors, secretary, chief engineer, engineers, and clerks	2,632	11	8				
Charges, collectors commission, accounts, &c.	3,157	0	1				
Rent and taxes	3,391	5	4				
Purifying material	444	8	3				
Wear and tear	6,901	17	10				
,, Repairing meters	925	0	0				
Interest on bonds	3,343	0	0				
Law costs	250	0	6				
Interest account	1,465	14	8				
Bad debts	989	10	6				
				80,172	11	4	
Net balance				£12,982	10	0	

Mr. JOHN D'ARCY asked whether the accounts were made up according to the Act of Parliament.

The SECRETARY replied that they were.

The CHAIRMAN said: The report goes so fully into matters of detail, that it is almost unnecessary for me to allude to the operations of the half year further than to express my regret that they have not been as favourable as usual. The public journals will have apprised you that we are not alone in misfortune. In almost every locality throughout the three kingdoms the directors of the gas companies have laboured under serious disadvantages. In many places the expenses have enormously increased; and, although the directors have given notice of their intention to increase the price, they have still the difficulty of obtaining supplies, either of materials or of labour. Our account, as I have already observed, is not as favourable as we could wish, but for that I think we must be held blameless, because if matters had remained in the same state up to June as in the corresponding period of 1871, the profits of the present half year would have been quite as large. Unfortunately, however, for us, matters have been very different indeed—coals, freights, wages, labour, materials of every description, were so high and scarce, and I regret to say continue so. No one could have contemplated the existence of such a state of things a few months ago. I think I may congratulate the shareholders on the fact of our having to some extent anticipated the difficulties of our position, because early in the spring we deputed one of our officers to visit the coal-producing districts of England and Scotland, with the view of obtaining tenders for supplies. The result was that the board was enabled to enter into large contracts on advantageous terms. I assure you, gentlemen, the past six months have constituted a very anxious period to your directors. In point of fact, the anxiety at one time was not caused so much by the price of coal, labour, freight, &c., as by the difficulty of obtaining them on any terms. Of the difficulties we have had to encounter at home I am unwilling to say much; indeed, I only refer to them incidentally, and for the purpose of making the proprietors aware of the fact that, within the very brief period of a few months, we have been compelled, at the risk of leaving the city in darkness, to submit to demands of a very formidable character from almost every class of workmen in the employment of the company. Stokers, whose wages were formerly 29s. a week, are now receiving 35s.; yard labourers, 18s.; while the coal heavers and coal carriers wages have increased enormously, some of the latter earning from 5s. to 7s. per day. This is a state of things, gentlemen, for which we were not prepared, and, as you can easily imagine, when combined with the increased cost of the raw as well as the manufactured materials so largely employed in the production of gas, has seriously affected the operations of the half year. I beg to move the adoption of the report and accounts.

Mr. BOYCE, D.L., seconded the motion.

Mr. JOHN D'ARCY thought there was almost a crisis in the affairs of the company. If they were to be a dividend-paying concern the expenses should be reduced. They appeared, by the accounts, to have spent £80,000 to earn £93,000; in other words, the expenses were about 90 per cent. of the earnings, an amount out of all proportion. There had been a falling off of 2 per cent. in the dividend, and £1400 was to be taken from the depreciation-fund. He did not know where that depreciation-fund was. He found that £37,000 was due to them, and that they owed £102,300, and again he said they should make some effort to reduce their expenses. There was another important question. He wished to know whether the company had any power to increase the price of gas, and if not, did they intend to seek parliamentary powers to do so? The shareholders should remember the case of the Midland Railway Company, where the reduction of expenses and improved management raised the concern out of misfortune into prosperity. How, he asked, was that change effected? It was by having a man like Ralph Cusack chairman, and a really efficient board to sustain him. There ought to be a reform in the directory. The number of directors ought to be reduced, and the men on the board should be able to give their time fully to the affairs of the company, and not to be occupied as directors of seven, eight, or nine other companies. Let the minimum number of directors be appointed, and pay them well; for the amount of remuneration to the directors was nothing if they looked after the business. He intended at a later stage to move a resolution that the eight directors be paid £100 a year only, instead of dividing £1300 a year, the sum paid to the board when there were thirteen directors. He held that where they were getting only 6 per cent. dividend the remuneration of the board should be cut down. The expenses, he contended, could be cut down one-half. The other day he asked to see the registry of shareholders, for he was told that some of the directors only held the fifty shares that qualified them, but he was told that he was not legally entitled to see the document. He contended that he was legally entitled to see the registry. He would again remind them of the case of the Midland Company, whose shares were at one time at 50 per cent. discount, but now paid a large dividend, and he trusted that the shareholders would that day take some action towards cutting down the expenses of the company, and placing its dividend on the best foundation.

The CHAIRMAN begged to remind Mr. D'Arcy that the company was paying only 6 per cent., not 8 per cent., when the salaries of the directors were fixed. He might also observe that the directors at one time of their motion solely reduced their remuneration.

Mr. FOTTRELL wished to set Mr. D'Arcy right. He remembered distinctly the time when Mr. D'Arcy mooted the question of reducing the directors, and his proposition was to cut down the number so as to leave the salary of each director £150 a year, but ultimately it was agreed that the thirteen directors should be continued until in the course of nature they would reduce to the number at present, the thirteen, however, so long as they remained, to be paid the same as the nine would be. That was the clear understanding.

Mr. D'ARCY said that the clear understanding was that the directors were to be paid each £100 a year.

Mr. FOTTRELL said that was not so. He perfectly remembered what occurred. The directors were to get only £100 a year each while the number was thirteen. But when reduced to nine payment was to be otherwise.

Mr. D'ARCY thought the directors were very well paid at £100 a year when the dividend was only 6 per cent.

The CHAIRMAN, in reply to Mr. M'Dermott, T.C., said some of the directors held only 50 shares. Others had a much larger stake in the concern.

Sir JOHN GRAY, M.P., wished to say, for the information of Mr. M'Dermott, that he held only 50 shares in the company. He had never held more, he had never held less, and he did not join the company to buy and sell shares. He thought it wise, prudent, and proper to hold exactly what qualified him, and not a larger amount of stock, which, subject to fluctuations of value, would tempt to dealings for profit in the share market. He was chosen director when the holder of 50 shares; he had never increased that number, and he did not intend to do so.

Mr. D'ARCY asked what about the refusal to let him inspect the share registry.

The CHAIRMAN said Mr. D'Arcy was under some mistake. He happened to be in the office below with Mr. Fottrell when the clerk came in and said it was not legal to look at the registry. Both he (the chairman) and Mr. Fottrell at once desired the book to be thrown open, but the clerk came back saying Mr. D'Arcy was in a passion, and would have no more to do with it.

Mr. D'ARCY said the clerk had misinformed the chairman.

Mr. FOTTRELL observed that under the Act of Parliament the only inspection that should be given was of the names and residences of the shareholders, not of the number of shares.

Mr. D'ARCY differed from this view of the Act. He wanted to know again if the accounts were in the form specified by the Act of Parliament.

The SECRETARY: What Act?

Mr. D'ARCY: The last Act.

The SECRETARY: There is not a word in the last Act as to the form of the accounts. Whatever mode is prescribed by the former Act has always been, and is in the present instance followed.

Mr. MILO BURKE, J.P., said, as Mr. D'Arcy had alluded to the payment of the directors, that, if the directors were to be paid according to the time, attention, and anxiety they gave to the affairs of the company, £150 a year would be very inadequate remuneration. For his own part he could say that he never lost an opportunity of attending to the business of the company. He held considerably more than 50 shares—he did not know how many Mr. D'Arcy held—but he thought that Mr. D'Arcy, instead of coming there to scold the directors, ought rather to sympathize with and be thankful to the directors for the time and labour they had given to the affairs of the company during the very anxious period of the past six months. In common with every other gas company, they had passed through a very trying time—so trying, in fact, that at one time they feared they might have to leave the citizens in darkness, owing to the difficulties caused by combinations, and the increased price of materials. He regretted very much that Mr. D'Arcy should have deemed it right to adopt the tone he did. All he (Mr. Burke) could say was that Mr. D'Arcy's strictures on the management were wholly undeserved by the directors.

The CHAIRMAN then put the resolution that the report and accounts be received and adopted, and declared it carried. He next moved a resolution declaring a dividend at the rate of 6 per cent. per annum (free of income-tax), on the profits of the past half year.

Mr. BURKE seconded the resolution, which was passed.

Mr. D'ARCY moved that the salary of each director be in future £100 a year.

Mr. M'DERMOTT, T.C., seconded the motion.

The CHAIRMAN said he must refuse to take the motion, on the ground that there was no notice of it to the meeting.

Mr. D'ARCY said if his motion was refused, he would like to know what satisfaction he and other shareholders got by coming there.

The CHAIRMAN answered, the satisfaction of getting a full and fair statement of the affairs of the company.

Mr. M'DERMOTT wished to be told for what they were convened that day.

The CHAIRMAN replied for the business on the paper—the resolutions that had been moved, seconded, and carried.

Mr. D'ARCY required to know whether his motion was refused?

The CHAIRMAN said it was.

Mr. D'ARCY thought this was shameful.

Sir JOHN GRAY begged to offer a suggestion which he hoped would ensure perfect harmony. They were meeting under very trying circumstances; they had passed through a very trying time. The prospects of the coal market, the iron market, and the labour market were not very cheering, and the spirit that should now prevail between shareholders and directors was one of mutual sympathy and good feeling. (Hear, hear.) The directors had given their time, their labour, and their energy—whatever these were worth—for the benefit of the shareholders who placed confidence in them, and possibly, if this question of payment was left to the directors themselves to deal with, the result would leave no room for any difference on this paltry matter now before the meeting.

The CHAIRMAN: The directors on a former occasion voluntarily relinquished a certain amount of payment.

Sir JOHN GRAY said they did. He threw out the suggestion that the directors should be left to decide the matter themselves, not that he at all questioned the decision of the chairman that the motion could not legally be put, but in order to have perfect harmony——

A SHAREHOLDER interposed: There is no question before the chair, and to speak is out of order. (Cries of "No.")

Sir JOHN GRAY thought the meeting was in favour of hearing him. (Hear.)

The SHAREHOLDER repeated that there was no question before the chair.

Mr. D'ARCY said Sir John Gray should not be interrupted. Sir John Gray was the kind of director the company wanted. He was the author of the greatest success Dublin ever saw, and the city and the country were equally proud of him. (Hear, hear). He (Mr. D'Arcy) wished that Sir John Gray was chairman of the company, and that his parliamentary duties did not take him so much away. If they did not, the company would now be in a different position.

Sir JOHN GRAY resumed: This was peculiarly a time when complete good feeling should unite the shareholders with the board, and both should combine to serve the interests of the concern they all had at heart. (Hear, hear.) It certainly was not beneficial to the shares, nor beneficial to the position of the company, that any difference should arise as to a paltry payment to the board; and if the matter was left to the directors themselves to settle, he believed—he knew he spoke his own feelings in this—that they would rather give their time and services gratuitously for the benefit of the shareholders than be in any sense a burden on them. Let the question then be left to the directors themselves to see what could be done——

Mr. DUNDON said the directors ought not, under the circumstances, to have more than £100 a year each.

Sir JOHN GRAY said if the shareholder heard him out he might agree in the suggestion——

Mr. DUNDON said he would hear Sir John Gray, whom he loved and respected as a man to whom all Ireland owed a debt of gratitude which never could be repaid (applause), but he did not agree with him in this——

Sir JOHN GRAY said his suggestion was intended to secure entire harmony. The regular and leading forms guiding the chairman should be rigidly adhered to, otherwise the most outlandish propositions might be submitted, to the detriment of the shareholders. It was only right that legal and proper notice should be given of every motion; at the same time he unhesitatingly said that the spirit of Mr. D'Arcy's resolution was not objectionable. (Hear, hear.) And he believed (though he only spoke for himself) that, if the directors had to act upon it, they would almost unanimously vote in favour of the spirit of the proposition. (Hear.) At the same time, he (Sir John Gray) thought that the chairman, who should act upon settled rules, ought not to be asked to put a resolution of which notice had not been given. Any irregularity of that kind might lead to evils hereafter, which none could now foresee. If the directors themselves personally intimated to the meeting their views, all the resolution sought might possibly be met, and this really trifling matter not allowed to interrupt the harmony that had always prevailed between the board and the shareholders. (Hear, hear.)

Mr. D'ARCY said he would be perfectly satisfied if the directors now stated that they, eight in number, would be satisfied with £100 a year each.

Dr. BOLLAND thought it was asking too much of the directors to give an absolute pledge after the courteous and satisfactory manner in which Sir John Gray had dealt with the question.

Mr. D'ARCY said he would like to hear what the directors would say.

The CHAIRMAN said he was inclined to think his brother directors fully coincided in the views of Sir John Gray. He could not, however, pledge himself, but he might repeat that, on a former occasion, the directors voluntarily reduced their salaries. (Hear, hear.)

Mr. BOYCE thought if the shareholders left the matter in the hands of the directors they would have no reason to complain. His exertions on the board, he could assure them, would not be lessened by anything said that day.

Mr. D'ARCY said he wished to know whether he would have to press his resolution or not. Sir John Gray, as he always did, spoke out manfully his own views, and they met the approval of the shareholders. Let the other directors imitate Sir John Gray, and speak out in a manly way upon the question.

Dr. BOLLAND thought that too much pressure was being put on the directors.

Mr. BURKE said no pressure at all was needed. As far as he was concerned, he would bow to any decision the board came to. But this he would say, that £150 a year was not at all too great payment to a director of that company who did his duty properly, and attended to the interests of the shareholders, assuming the enormous responsibility of dealing with the affairs of so great a concern.

Mr. D'ARCY remarked that in attending to the interests of the concern the directors were attending to their own, according to the stake they had in the company. The directors got a large per centage on their investment in the company.

Mr. M'DERMOTT: And when the dividend gets up again we will restore the directors payment.

Mr. FOTTRELL said he would always defer to the board on a board question, and if the directors decided that they would receive no salary until the company paid 10 per cent. he would agree. But instead of talking of reducing the remuneration of the directors there ought to be a suggestion the other way, because no shareholder present had any conception of the trouble, inconvenience, and labour visited upon the board during the past six months. It had been said that to earn £90,000 it took £80,000. Why, it might take £100,000 to earn £90,000.

A SHAREHOLDER said there was no use in having coal contracts.

Mr. FOTTRELL said that no colliery owner made a contract except with a condition that the workmen would continue at work and give the supply; and when these combined and would raise no more coal than was necessary for daily supply, there really was no remedy. To show the difficulties the directors had to encounter, he might mention one instance in which they sent a screw collier to a port to load 420 tons. After being detained for sixty-nine hours over time, the vessel had to sail 100 tons short of her cargo, and the company had to pay freight on the whole 420 tons besides demurrage for the over-time. The scarcity and dearness of coal, and the high price of labour, had raised up great embarrassments, all of which the directors had to deal with; and he could state with confidence that every member of the board had paid the strictest attention to the interests of the company; and they had certainly passed through a very exceptional time.

Mr. DRUMMOND said that, as a director, he was so disappointed at the tone of some of the observations made that he would be quite willing, if the shareholders would allow him, to retire from the board (No, no.) He had always given the greatest attention to the business of the company. He had been more anxious about it than he had been about his own private affairs, and knowing as he did that the directors had done everything that could be done for the good of the company, and that the ship had been weathered so far, he confessed he was sorry to find that they had been met in a rather unpleasant spirit——

Mr. D'ARCY said Mr. Drummond was one of the best directors on the board, and he always so regarded him. But he did not understand a gentleman being a director of seven or eight companies, running from one to another, and not giving due attention to any.

Mr. DRUMMOND said he did not know to whom Mr. D'Arcy referred. But he could say of all his brother directors they gave their best attention to the business of the company.

Sir JOHN GRAY felt it would be unfair to his colleagues if he did not say that he was unaware of a single member of the board who was not constant in his attendance, most careful in his examination of business details, and most conscientious in the exercise of his judgment for the benefit of the company. He happened to know that one or two of the directors were on the boards of other companies, but so far from these gentlemen being the least active directors of the gas company, they were amongst the most diligent and punctual; they were the first to arrive and the last to leave the board meetings.

The CHAIRMAN, in reply to a shareholder, said the company had not entered into any contracts for the supply of coke. That article now realized for the company double its former price.

Mr. DRUMMOND expressed a wish that shareholders would visit the company's works, which certainly were second to none in the United Kingdom.

Mr. D'ARCY said that, having regard to the excellent way Sir John Gray had dealt with the question of the directors salary, he would leave the matter in the hands of the directors as suggested. (Hear, hear.) He would be glad to have an answer to his question, whether the company had power to raise the price of the gas.

The CHAIRMAN: We have not.

Mr. D'ARCY: Do you intend to apply to Parliament for power to do so?

The CHAIRMAN said the question had not yet been mooted at the board.

Mr. FOTTRELL, in reply to Mr. M'Dermott, said the dividend would be paid out of the *bonâ fide* profits of the half year. There was a debt of £60,000 due to capital, owing to the increased expense in enlarging and perfecting the works, and there would have to be a call made after some time.

Mr. D'ARCY observed that, with the monopoly enjoyed by the company—the privilege of supplying the whole city and districts around with gas—the company ought to pay 10 per cent. He again advised a reduction of expenses and a revision of office expenses. The books and accounts of the company were kept in the most admirable manner; a child could understand them; yet the book-keeper had only £150 a year, while other officers who did less work than their book-keeper had far higher salaries. This ought to be looked to. He had given notice of a motion that the report and accounts should in future be sent out to the shareholders seven days before each meeting, and he now would move the resolution.

Mr. M'DERMOTT seconded the resolution.

Mr. FOTTRELL said there was no difficulty about complying with the resolution, which was then passed.

On the motion of Mr. M'Dermott, Sir John Gray was called to the second chair.

Mr. D'ARCY then moved that the marked thanks of the meeting be given to Mr. Denis Moylan for his dignified conduct in the chair, and his services as chairman of the directory.

Mr. TALLON seconded the resolution, which was passed unanimously.

Mr. DENIS MOYLAN briefly acknowledged the compliment.

On the motion of Mr. TALLON, seconded by Mr. DEAKER, a vote of thanks was passed to the directors for their proper and satisfactory management of the affairs of the company during the past half year.

The proceedings then terminated.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of the Shareholders in this Company was held at the Chief Office, Horseferry Road, Westminster, on Friday, the 4th inst.—SIMON ADAMS BECK, Esq. (the governor) in the chair.

The SECRETARY (Mr. J. O. Phillips) having read the notice of meeting, the corporate seal was affixed to the register of shareholders, and the minutes of the last ordinary and extraordinary meetings read and approved.

The following report and statements of account were submitted:—

The directors have the honour to report to the proprietors that the bill which they introduced into Parliament in the last session, for raising an additional million of share capital to meet the cost of the extensions at Beckton previously notified as already necessary, received the Royal Assent on the 13th of May, and they have the pleasure to state that the capital thereby authorized to be raised will, as in the case of that sanctioned in 1868, be entitled to the maximum parliamentary dividend of 10 per cent.

Four large additional gasholders which were urgently required are now in course of construction, but, owing to the sudden and enormous increase in the price of iron, the directors have deemed it prudent to postpone entering upon further works, and to defer until an easier period the carrying out of the rest of their proposed extensions. They will therefore, during the coming winter, be compelled to resume manufacture at Blackfriars, where it has been suspended during the whole of the past summer.

The directors have further to report that an amalgamation, on terms of equality, has been concluded with the Western Gaslight Company, Limited, which, having already received the sanction of the Board of Trade, now awaits only the formal approval of the Privy Council.

As in the case of all other gas companies, the directors, as the proprietors will be prepared to learn, have been compelled to make their new coal contracts at largely advanced prices, and to this increased burden on the resources of the company has been added a material rise in the wages of their workmen. By the public Act of 1868, which governs their proceedings, the directors are precluded, until the month of January, from taking any step towards an increase in the price of gas to meet these extra charges upon them. It is, however, satisfactory for them to add that, the necessity for the adoption of such a course not having as yet manifested itself, they are enabled, in spite of an outlay of additional capital on works amounting to nearly £100,000, to declare a dividend on the ordinary shares at the rate of 10 per cent. per annum, the warrants for which, as well as for the dividends on the several classes of preference shares, will, according to ordinary custom, be issued 14 days after the meeting.

THE GASLIGHT AND COKE COMPANY.

Half Year ending June 30, 1872.

No. 1.—STATEMENT OF SHARE CAPITAL, *on June 30, 1872.*

Acts of Parliament regulating the Capital of the Company.	Description of Capital.	Maximum Dividend authorized.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Amount not paid up or unissued.	Total Amount authorized.
The Gaslight and Coke Company's Act, 1863	Share A Ordinary stck.	10 per cent.	90,000	£10	£10	£900,000	..	£900,000
	Share preference	5 per cent. with option of conversion.	25,000	10	10	250,000	..	250,000
	Ditto.	Ditto.	20,000	10	10	200,000	..	200,000
	Ditto.	Ditto.	20,000	10	2	40,000	£96,357	200,000
The Victoria Docks Gas Company's Act, 1857	Ditto.	Ditto.	10,000	10	2	20,000		100,000
			Amount received in anticipation of calls			143,643		
The City of London Gas Company's Act, 1859	Share A Ordinary stck.	10 per cent.	30,000	10	10	300,000	..	300,000
	Share B ditto.	4 per cent.	10,000	10	10	100,000	..	100,000
The Great Central Gas Consumers Act, 1851	Share C Prefer. stock.	10 per cent.	20,000	10	10	200,000	..	200,000
The Equitable Gaslight Company's Act, 1842	Share D ditto.	10 per cent.	12,000	25	25	300,000	..	300,000
The Gaslight and Coke Company's Act, 1872	Share A.	10 per cent.	..	..	..	..	1,000,000	1,000,000
						£2,453,643	£1,096,357	£3,550,000

No. 2.—STATEMENT OF LOAN CAPITAL, *on June 30, 1872.*

Acts of Parliament regulating the Capital of the Company.	Description of Loan.	Rate of Interest.	Total Amount borrowed.	Remaining to be borrowed.	Total Amount authorized.
The Gaslight and Coke Company's Act, 1868	Debentures.	4½ per cent.	£300,000	..	£300,000
	Ditto.	4½ per cent.	62,500	..	62,500
	Ditto.	4½ per cent.	50,000	£50,000	100,000
The City of London Gas Company's Act, 1859	Ditto.	4 per cent.	500		
	Ditto.	4½ per cent.	37,245		60,000
	Ditto.	5 per cent.	22,255		
The Great Central Gas Consumers Act, 1851	Ditto.	4½ per cent.	28,950	..	66,000
	Ditto.	5 per cent.	37,050		
The Victoria Docks Gas Company's Act, 1857	..	..	..	25,000	25,000
The Gaslight and Coke Company's Act, 1872	..	..	..	250,000	250,000
			£538,500	£325,000	£863,500

No. 3.—CAPITAL ACCOUNT, *for the Half Year ending June 30, 1872.*

Dr.

	Expenditure from June 24, 1868, to Dec. 31, 1871.	Expended this Half Year.	Total Expenditure to June 30, 1872.
	£ s. d.	£ s. d.	£ s. d.
To Expenditure to June 24, 1868, including expenditure of Equitable Gas Co. to June 30, 1871	..	..	1,742,904 0 1
Since June 24, 1868—			
Lands acquired, inc. law charges	198,449 6 3	921 0 10	199,370 7 1
Buildings, manufacturing plant, storeage, and other structures connected with manufacture	586,308 16 2	86,012 0 10	672,320 17 0
New mains and service-pipes, inc. laying, paving, and other works connected with distribution	141,835 8 6	22,636 17 3	164,472 5 9
Meters (additional), inc. fixing	29,900 9 0	2,634 4 0	32,534 13 0
Parliamentary costs	6,720 6 9	1,497 10 3	8,217 17 0
Interest on capital raised for works at Beckton	50,881 5 1	..	50,881 5 1
	1,014,095 11 9	113,701 13 2	2,870,701 5 0
Cr.			
By Amount realized on sale of surplus lands		3,556 0 0	
Ditto ditto of disused plant		1,960 10 4	
Premium on shares sold		9,764 0 0	
			15,280 10 4
			2,855,420 14 8
Balance of capital account			136,722 5 4
			2,992,143 0 0

Cr.

	Certified Receipts to Dec. 31, 1871.	Received during Half Year.	Total Receipts to June 30, 1872.
	£ s. d.	£ s. d.	£ s. d.
By Ordinary shares, of £10 each	1,200,000 0 0	..	1,200,000 0 0
B shares, of £10 each	100,000 0 0	..	100,000 0 0
C ditto, ditto	200,000 0 0	..	200,000 0 0
5 per ct. pref. shares, of £10 each	250,000 0 0	..	250,000 0 0
Ditto ditto, second issue	199,434 0 0	566 0 0	200,000 0 0
Ditto ditto, third ditto	32,986 0 0	27,014 0 0	60,000 0 0
Amount in advance of calls	71,488 0 0	72,155 0 0	143,643 0 0
D shares, of £25 each	300,000 0 0	..	300,000 0 0
Debentures	538,500 0 0	..	538,500 0 0
	2,892,408 0 0	99,735 0 0	
Total			2,992,143 0 0

No. 4.—REVENUE ACCOUNT, *for the Half Year ending June 30, 1872.*

Dr.

	£ s. d.	£ s. d.
To Manufacture of gas—		
Coals, including carriage, trimming, and dues, &c. (*see* Account No. 9)	164,627 6 1	
Purifying materials, water, &c.	3,736 11 10	
Salaries of superintendents and officers at works	3,431 15 3	
Wages at works (manufacture)	34,131 13 7	
Repair and maintenance of works and plant, including renewal of retorts, machines, apparatus, materials, and labour	19,387 15 0	
	225,315 1 9	
Less old materials sold	1,964 14 2	
		223,350 7 7
Distribution of gas—		
Repair, maintenance, and renewal of mains and service-pipes, including materials, laying and paving, and labour	10,194 14 1	
Salaries of inspectors, assistant inspectors, and clerks in Light Office	2,911 9 7	
Meters—repairing, renewing, and refixing	5,219 6 6	
		18,325 10 2
Public lamps—		
Lighting and repairing	..	4,640 10 0
Rents, rates, and taxes—		
Rents	3,116 4 6	
Rates and taxes	8,466 9 2	
		11,582 13 8
Management—		
Directors allowance	2,456 14 6	
Salaries of secretary and office clerks	2,092 9 6	
Collectors commission	5,251 11 3	
Stationery, printing, and general charges	1,479 15 9	
Company's auditors	75 0 0	
		11,355 11 0
Public officers—		
Company's proportion	..	764 10 7
Law and parliamentary charges—		
Law	..	130 19 0
Depreciation-fund for works on leasehold lands	..	100 0 0
Superannuation allowances under amalgamation schemes, and annuities	..	4,461 9 6
Bad debts	..	1,143 1 1
Workmen's Provident Fund	..	355 17 4
		276,190 9 11
Balance carried to net revenue account		110,869 17 2
		387,060 7 1

Cr.

	£ s. d.	£ s. d.
By Sale of gas—		
Common gas (1,345,116,000 cubic feet), at 3s. 9d. per 1000 cubic feet (16-candle gas)	252,209 6 10	
Cannel gas (155,180,000 cubic feet), at 5s. 5d. per 1000 cubic feet (23-candle gas)	42,027 19 5	
Public lighting and under contracts	21,609 7 4	
		315,846 13 7
Rental of meters	..	2,928 10 9
Residual products—		
Coke (Account No. 10)	43,143 18 8	
Breeze	1,096 19 6	
Tar	7,253 16 9	
Ammoniacal liquor	14,882 6 4	
		66,377 1 3
Rents	..	1,435 0 1
Transfer fees, &c.	..	86 18 6
Canteen account (Beckton)	..	386 2 11
		387,060 7 1

Dr. No. 5.—NET REVENUE ACCOUNT, *for the Half Year ending June 30, 1872.* *Cr.*

	£ s. d.		£ s. d.	£ s. d.
To Interest on debentures accrued to June 30	12,638 5 3	By Balance of net revenue, Dec. 31, 1871	71,582 7 0	
Dividend on B shares, at 4 per cent. £2,000 0 0		Less dividend declared for the half year ending that day	60,000 0 0	
Ditto on C ditto, at 10 ditto 10,000 0 0				11,582 7 0
Ditto on D ditto, at 10 ditto 15,000 0 0		Bankers interest—balance		310 13 3
Ditto on preference shares, at 5 per cent. 15,870 1 9		Balance from revenue account, No. 4		110,869 17 2
	42,870 1 9			
Defalcation account (Great Central Gas Consumers Company)	2,500 0 0			
	58,008 7 0			
Balance of net revenue applicable to dividend on £1,200,000 ordinary stock	64,754 10 5			
	122,762 17 5			122,762 17 5

Dr. No. 6.—INSURANCE-FUND ACCOUNT, *for the Half Year ending June 30, 1872.* *Cr.*

	£ s. d.		£ s. d.
To Balance on June 30, 1872	30,183 3 4	By Balance on Dec. 31, 1871	29,979 2 0
		Interest on amount invested	204 1 4
	30,183 3 4		30,183 3 4

Dr. No. 7.—DEPRECIATION-FUND ACCOUNT (for Works on Leasehold Lands), *for the Half Year ending June 30, 1872.* *Cr.*

	£ s. d.		£ s. d.
To Balance on June 30, 1872	2,306 2 6	By Balance on Dec. 31, 1871	2,206 2 6
		Amount brought from revenue account	100 0 0
	2,306 2 6		2,306 2 6

Dr. No. 8.—DEFALCATION ACCOUNT (Great Central Gas Consumers Company), *June 30, 1872.* *Cr.*

	£ s. d.		£ s. d.
To Balance on Dec. 31, 1871	19,858 7 5	By Amount brought from net revenue account, for the half year to June 30, 1872	2,500 0 0
		Balance	17,358 7 5
	19,858 7 5		19,858 7 5

No. 9.—STATEMENT OF COALS USED, &c., *during the Half Year ending June 30, 1872.*

Description of Coal.	In Store, Dec. 31, 1871.	Received during Half Year.	Used during Half Year.	In Store, June 30, 1872.
	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.
Common	21,369 3	201,211 15	181,619 15	40,961 3
Cannel	13,374 12	19,786 17	20,811	12,350 9

No. 10.—STATEMENT OF RESIDUAL PRODUCTS *made and disposed of during the Half Year ending June 30, 1872.*

	In Store, Dec. 31, 1871.	Made during Half Year.	Used in Manufacture during Half Year.	Sold during Half Year.	In Store, June 30, 1872.
Coke—					
Common—chaldrons	2,506¼	187,189	61,085¼	127,813¼	796¼
Cannel—ditto					
Breeze—ditto	1,066¼	16,830½	..	17,687½	209¼
Tar—gallons	346,098	1,991,799	..	2,103,834	234,063
Ammoniacal liquor—ditto	394,384	4,920,047	..	4,976,215	338,216

Dr. GENERAL BALANCE-SHEET, *to June 30, 1872.* *Cr.*

	£ s. d.		£ s. d.	£ s. d.
To Capital account—		By Cash at bankers	..	32,065 12 7
Balance at credit thereof (Account No. 3)	136,722 5 4	Ditto on deposit	..	50,000 0 0
Net revenue account—		Ditto invested at interest	..	12,486 2 0
Balance at credit thereof (Account No. 5)	64,754 10 5	Stores on hand, viz.:—		
Insurance-fund account—		Coals	45,177 3 9	
Balance at credit thereof (Account No. 6)	30,183 3 4	Coke and breeze	313 5 1	
Depreciation-fund (for works on leasehold lands)—		Tar and other products	1,752 18 2	
Balance at credit thereof (Account No. 7)	2,306 2 6	Sundry stores	13,771 6 11	
Unpaid dividends	6,651 6 2			61,014 13 11
Dividends accrued due, and provided for to June 30, 1872	41,976 19 3	Outstanding accounts due to the company, viz.:—		
Interest accrued due, and provided for to June 30, 1872	9,968 11 1	Light account—		
Amount due for coals and to sundry tradesmen and others	25,179 8 5	Arrears uncollected	10,768 4 6	
Ditto due for wages	3,631 6 7	Quarter ending June 30 to be collected	112,979 5 1	
Benevolent-fund	1,151 5 0		123,747 9 7	
		Coke and other products	7,255 5 1	
		Sundry accounts	17,836 5 6	
				148,839 0 2
		Ship *Dispatch*	..	791 2 0
		Defalcation account (Great Central Consumers Company)—		
		Balance at debit thereof (Account No. 8)	..	17,358 7 5
	322,554 18 1			322,554 18 1

I certify that the above accounts are correct, and that the balance of net revenue, for the half year ending June 30, 1872, is £64,754 10s. 5d., and that such amount, subject to deduction for income-tax, is applicable to payment of dividend on £1,200,000 ordinary stock.

Sept. 19, 1872. (Signed) CHAS. H. PARKES, *Official Auditor.*

The GOVERNOR: Gentlemen, it now becomes my pleasing duty to offer to you a few observations—and they will be very few—on the present occasion. But, before entering upon any discussion of the report, I think I ought to congratulate you upon the amalgamation which has been effected of the Western Gas Company with this company. That amalgamation is now complete, with the exception of the consent of the Privy Council and the signature of Her Majesty, which we expect to receive daily. I have great hope, as have all my brother directors, that it will prove to be a most advantageous arrangement for both companies. The Western shareholders join us on equal terms as to dividend and other matters; they bring with them a reserve-fund of £30,000 to add to our funds, and they bring also, what is of much more importance, a large unoccupied district, which we trust will soon be built over for us to supply with gas. We have, therefore, every prospect that the amalgamation will be of immense advantage to this company, while the increasing economy of our manufacture cannot fail to add to their security. With respect to the accounts of the past half year, I need hardly remind you that circumstances have arisen since we met you here in April last, which seriously affect the interests of gas companies, because you are all aware of the extraordinary rise which has taken place in the cost of coal and iron. I assure you it has been a subject of great anxiety with your directors. Fortunately for us the increase did not affect us during the half year ending in June last, because our contracts for coal did not end until the 1st of October inst., but we thought it so hazardous a position to remain in, that we took new contracts three months ago for the ensuing year, and though they were taken at a very large increase of price over former contracts, I am happy to tell you that our foresight was of great advantage, for if we had to take contracts now we should have to pay from 7s. to 8s. per ton more than we have arranged to pay for the larger portion of our requirements during the next year. We have therefore nothing to complain of at present on that account. With respect to the figures of our accounts, I may call your attention to a few facts which I think you will consider very satisfactory. In June, 1872, we had £28,000 more interest and dividend to provide than we had in June, 1871. Up to that time we charged, under the powers of our Act of Parliament, the interest on the capital raised for the works at Beckton to capital account, but for the last half year we have been obliged to charge it to income. That amounts to £28,508 as against £3148 in June, 1871, making a difference of £25,360 against the profits of the company. Notwithstanding that large increase, however, our economies and our earnings have so progressed that we are enabled to give you the same dividend that we did then, withdrawing only about £4500 from the surplus income of the last half year. If you recollect, we carried over about £11,700 last half year; therefore, deducting as we do from that legitimate source £4500, we are able to pay £25,000 for dividends and interest this half year more than we did in the

corresponding half of 1871. This again, I think, shows the flourishing condition of the company. With respect to the cost of coal, I may state that for the half year ending in June, 1871, it amounted to 16s. 6½d. per ton; last half year it only cost us 16s. 3½d. Our coke and breeze we sold for 4s. 4d. per ton of coal carbonized in the half year ending June, 1871; last half year we got 4s. 4½d. Tar and other products realized in the former period an average of 1s. 4½d.; last half year they realized 2s. 2d. Bad debts in the first half of 1871 amounted to 1s. 1½d. per ton; last half year they were only 1½d.; so you see that in every way the company are prospering, and I hope we shall continue to be so. The quantity of coal carbonized by us in the half year ending June, 1871, was 196,000 tons; in the last half year it was 202,000 tons. Upon a careful consideration of the position of our works at Beckton, I find that all our hopes have been realized, and as we increase our manufacture there, as we should already have done but for the enormous cost of iron, they will be still more advantageous to us. As it is, we have been obliged to postpone till better times the duplication of our mains and the erection of new gasholders there. I was happy to-day to hear from a large ironmaster that the price of iron has receded £2 per ton. I hope it will soon go down a good deal more; in fact, it must do so. Our increased cost of coal commenced with the 1st of this month, and therefore for three months in the present half year we shall have to pay considerably more for coals than during the half year ending at Midsummer last. I tell you this that you may not be too sanguine with regard to your dividend next Christmas. I hope we may be able to keep it up, as we shall get an increased return for our products. Of course, coke is dearer; we get a larger price for it, and we have entered into advantageous contracts for our products generally. Taking the month of August as a fair criterion, our increase for products will amount to £60,000 a year. So you see that though we have some bitter pills in the enhanced price of coal and iron, we have a little sweetness in our returns for residual products. I trust, therefore, that for the half year ending at Christmas next we may be able to make as favourable a statement as we lay before you to-day, and that your dividend will be kept up to 10 per cent. With respect to the half year after that I am not able to say anything. It is a good while to look forward to, and I think the cost of iron and coal must go down before then, and I hope that we shall retain our prosperity when we get our additional works at Beckton. If the profit should be seriously reduced, we shall apply to the Board of Trade for permission to raise the price of gas, but we trust that course may not be necessary. I may mention that we have entirely given up the manufacture of cannel gas at the Westminster station, and that the Pimlico station we have devoted entirely to the manufacture of cannel, making no common gas there. We hope eventually to give up the Westminster station, and to supply all our common gas from Beckton, which, to us, will be a great advantage. We have made all our connexions, and when the amalgamation of the Western Company is completed we intend to supply their district of St. James's parish with cannel gas from our Pimlico station, which we can do more advantageously than they were able to do, inasmuch as they had a bad pressure, it being all down hill from their works, whereas with us it will be all up hill to that district. We calculate that we shall get from £5000 to £10,000 increased profit from that arrangement, so that, as I said before, our prospects are all good. I do not know that I need make any further observations, and therefore I will now move the adoption of the report, and if any gentleman has an observation to make, or an inquiry to put, I shall be very happy to hear and answer him.

The Deputy-Governor (the Hon. R. Howe Browne) seconded the motion.

Mr. Phillips: May I be allowed to ask whether the board have come to any decision with regard to the issue of the new capital. At present we know nothing about it either one way or the other.

The Governor: It depends entirely upon whether we want it or not.

Mr. Phillips: Then I understand the question is postponed for the present.

The Governor: It is posponed in this respect—that in consequence of the high price of iron, we have not laid our new main, nor proceeded with any new gasholders, as it is stated in the report. We shall not call for new capital till we actually want it. If the price of iron were to fall to anything like its former price, we should require the capital at once; for the sooner we make these additions to our works the better, provided we can do so at a reasonable cost.

A Proprietor: In the report last year, it was stated that the premises in Curtain Road were to be sold, and the amount received for them applied in reduction of capital. I do not see any mention of it in the present report.

The Governor: The premises in Curtain Road have been disposed of. The reserve we put upon them was £19,000, and they were not sold by auction, but we got £20,000 shortly afterwards from the railway company. This was not effected before June, and therefore it does not come into these accounts, but it will appear in the next half year's. There is one item which, perhaps, you have remarked in the accounts—viz., that we have nearly £10,000 profit from the sale of shares which were not taken up.

The motion was then put, and carried unanimously.

The Governor brought up a report from the court of directors recommending the declaration of the dividends, and moved a resolution in conformity therewith, which was also put, and carried unanimously.

A Proprietor: Are you using the Steam Stoker Company's apparatus at Beckton?

The Governor: No, we are not. We are using an apparatus like it, and have been doing so for some time; but, unfortunately, we cannot perfect it. The double action requires great accuracy and care, and we have been trying several experiments with reference to it. At present it is not a success.

Another Proprietor: As some presons are not acquainted with the time this company has been in existence, I think it would be as well if the date of its establishment were stated on the reports, or the number of the half-yearly meeting were given.

The Secretary: I will arrange to give it in future.

Mr. Yool: I wish to propose a resolution upon which I am sure we shall all be unanimous. We have had a most satisfactory report presented to us to-day, and I beg to move—"That the cordial thanks of the meeting be given to the governor, deputy-governor, and court of directors, for the great exertions made by them during the past half year."

Mr. Stokes: I have much pleasure in seconding the motion. I am sure we must be all satisfied with the report we have received to-day, and can only hope the next may be as good.

The resolution was cordially adopted.

The Governor: Gentlemen, on my own behalf and on behalf of my brother directors, I return you sincere thanks for the compliment you have paid us. It has been to us a most anxious half year, as you may well suppose. I am sure, from the way in which you have passed the last resolution, that our efforts have given you entire satisfaction. We have all endeavoured to do our duty faithfully, and I think, without flattering ourselves, I may say we have succeeded. I only hope that next half year we may be able to give you as good a report. Although we rejoice now, we must rejoice with fear and trembling. These are most anxious times for gas companies. We cannot, unfortunately, raise the price of gas till we can show that we are not able to pay our statutory dividends, and, supposing that event to happen, unless we could pay a greater dividend the next half year, we could not make up the deficiency in the 10 per cent. I hope it will not occur, but I am always desirous you should not go away with a wrong impression respecting the real state of things. I thank you, gentlemen, for this mark of your confidence and approval.

The proceedings then terminated.

BIRMINGHAM AND STAFFORDSHIRE GASLIGHT COMPANY.

The Half-Yearly Meeting of the Shareholders of this Company was held at the Office, Old Square, on Tuesday, Sept. 24—Mr. W. Sharp in the chair.

The following report and statement of accounts were presented:—

Agreeably with the requirements of the Act of Parliament, your directors have pleasure in laying before the proprietors a balance-sheet for the half year ending the 30th of June last, and the more so as it exhibits results beyond their expectation.

Although coals, iron, and every other article used in the manufacture of gas, as well as labour, have been at a cost beyond the calculation of your directors, yet the income upon the half year is equal to the amount required to pay the dividends; owing in some measure to your directors having made large contracts for coal, &c., &c., before the great rise in price took place.

The available balance will be seen by the annexed account to be £30,438 13s. 10d., which, after the payment of dividends, will leave a balance to be carried forward to the next account.

With the view of securing your works at West Bromwich against damage from mining operations, your directors have felt it to be their duty to purchase more land and mines adjoining the same.

The new retort-house referred to by your engineer in his last report is now completed, and the new mains then contemplated to be laid at West Bromwich, Handsworth, Harborne, Lozells, and neighbourhood are in an advanced state of progress; fortunately most of these mains were contracted for before the great rise in price took place.

Your directors inform you that they purpose making another call of £1 per share on the £28 shares, payable on the 1st of January next.

Since the last meeting Mr. Goodman, one of the oldest members of your board of directors, has resigned his seat thereat. In making this known, your directors feel that it is due to him to say that his services to this company, and the great interest he took in its progress over so many years, were highly valuable. In consequence of this resignation, your directors have had pleasure in filling up the vacancy at their board by the appointment of Mr. George Heaton.

Dr. Letheby continues to report from time to time the illuminating power and purity of your gas, and it is satisfactory to state that the illuminating power is higher than is strictly required by the Act of Parliament.

Your directors have thought it wise to write off a further sum of £5468 for depreciation.

At this meeting the following gentlemen retire in rotation from the direction, in accordance with your Act of Parliament, and they offer themselves for re-election—viz., Mr. Blakeway, Mr. Horton, Mr. Gibbins, and Mr. Sharp.

Dr. — *Profit and Loss Account, June 30, 1872.* — *Cr.*

To Coals	£55,733	9	10	By Balance brought from last half year's account	£31,328	7	8
Purifying materials and process	651	13	8	Sale of gas, after deducting £6000 for estimated discounts and bad debts	68,821	5	7
Repairs & maintenance of meters, mains, service-pipes, & other works	10,205	4	0	Coke and breeze	31,855	4	3
Wages	9,990	17	2	Tar and other residuals, and fittings	15,085	8	1
Lamps (providing, lighting, extinguishing, cleaning, and repairing)	1,174	19	9	Rents	235	19	8
Rates and taxes	2,780	11	0				
Salaries, collectors commission, and payments to directors	5,018	10	6				
Interest on loans	270	14	10				
Professional charges and incidental expenses	917	0	10				
One per cent. for depreciation on cost of works	5,468	0	0				
Dividends paid to proprietors—viz., 10 per cent. per annum on £320,400. Capital raised under Act of 8 & 9 Vict., cap. 66	16,020	0	0				
Seven and a half per cent. per annum on £225,000, raised under Act of 21 Vict., cap. 1	8,437	10	0				
Miscellaneous	218	19	10				
Balance carried to next half year's account	30,438	13	10				
	£147,326	5	3		£147,326	5	3

Dr. — *Balance-Sheet, June 30, 1872.* — *Cr.*

To Capital raised under Act 8 & 9 Vict., cap. 66	£320,400	0	0	By Cost of works, Dec. 31, 1871	£546,799	13	11
" " Vict. 21, cap. 1	225,000	0	0	Deduct for depreciation	5,468	0	0
" " Vict. 27 & 28, not bearing dividend	10,906	0	0		£541,331	13	11
Calls prepaid	4,089	0	0	Add extensions made during the half year	13,985	7	7
Amount of loans	13,825	0	0			£555,317	1 6
Reserved fund	61,756	4	3	Amount invested of the reserved fund		42,942	19 7
Amount owing by the company	32,081	17	10	Calls unpaid		12	0 0
Unclaimed dividends	321	5	3	Amount owing to the company for gas, cokes, residual products, fittings, &c. (exclusive of estimated discounts and bad debts)		68,635	2 0
Balance as above	30,438	13	10	Coals in stock		15,562	16 0
				Residual products, and other stock		5,522	1 11
				Cash in hands of treasurer and cashier		10,826	0 2
	£698,818	1	2			£698,818	1 2

The Chairman, in moving the adoption of the report, said he had great pleasure in meeting the shareholders and congratulating them that the directors were able to present such a satisfactory balance-sheet. Though he could not appear before them with the same words of promise as upon former occasions, because the directors were then under the impression that the raw materials for the manufacture of gas would maintain their prices, still it should be understood that when they took into consideration the probable and almost certain increase in the consumption of gas, and the increase in the value of the residuals, there was nothing to create distrust or depression. On the contrary, if even these should fail to meet the extra expenditure arising from the increase in the price of raw material, they had this pleasant resource to fall back upon—they could fall back upon their reserve-fund. The fact that coal

had increased 50 per cent., iron in like proportion, and that the cost of labour had increased, and might increase, made the directors fear that they would not be able to present such a favourable report next year. Possibly they should be called upon to increase the price of gas. The shareholders might, however, go on rejoicing in the hope that they need have no fear of their not obtaining a dividend as heretofore.

Mr. H. WIGGIN (deputy-chairman) seconded the motion, which was agreed to *nem. con.*

The CHAIRMAN proposed that a dividend be declared at the rate of 10 per cent. per annum on the capital raised under 8 & 9 Vic., c. 66, and 7½ per cent. on the capital raised under 21 Vic., c. 1, payable at the Birmingham Banking Company's bank on Monday, the 30th of September.

Mr. LUCKCOCK seconded the resolution, which was carried.

On the motion of the CHAIRMAN, Messrs. T. W. Blakeway, J. T. Horton, W. Gibbons, and W. Sharp were re-elected directors.

Mr. EDWARD LUCAS moved a vote of thanks to the chairman and to the directors. He said he had often been questioned as to the raising of the price of gas. As it only took £24,000 to pay the dividend, and there was £30,438 profit, and residuals had nearly doubled in value, it was impossible for them to raise the price of gas. Taking the last seven years, he found that the amount owing to the company was about the same, though their business was much larger. This he considered was very satisfactory.

Mr. MANLEY seconded the motion, which was agreed to.

The CHAIRMAN, in replying, said that the directors paid all their accounts with cash, and did not give bills. It was not every company which could do this.

The meeting then terminated.

MANCHESTER DISTRICT ASSOCIATION OF GAS ENGINEERS.

Lecture by THOMAS WILLS, Esq., F.C.S.,

ON THE RESIDUAL SULPHUR IN COAL GAS.

On Wednesday Afternoon, Aug. 28, Thomas Wills, Esq., F.C.S., of the Royal Institution, London, delivered a lecture "On the Residual Sulphur in Coal Gas" before the members of this association, at the Royal Institution, Manchester. Mr. JAMES JACQUES presided, and there was a numerous attendance of members.

Mr. WILLS said: Mr. President and gentlemen, you have done me the honour to request my services as your lecturer to-day, and I assure you I appear here in that capacity with great pleasure; nevertheless, I feel bound to say that my acquaintance with the practical department of gas manufacture is neither so complete nor so extensive as to give me that confidence in addressing you which I could desire.

Feeling this, I have ventured to choose a subject receiving a great deal of attention just now, which I shall endeavour to place before you from a chemical point of view, believing that the application of chemical facts and laws to such matters as gas managers have especially to deal with cannot but be productive of some good; for you will, I am sure, agree with me—and I believe I may say without risk of error—that a greater attention to the science of chemistry, together with a wider appreciation of its effects, is always attended with beneficial results when this knowledge is applied to industrial manufactures.

The numerous analyses that have been made at various times of coals of all kinds, from the almost vegetable lignite to the completely fossilized mineral anthracite, have shown that sulphur may be looked upon as a definite constituent, or impurity, of all coals whatsoever, its quantity varying somewhat, within certain small limits, but its presence invariable. I have written upon this table a series of analyses which have been made upon different varieties of coal, and which results formed part of a report to the House of Commons on the value of certain coals by Dr. Lyon Playfair. The per-centage of sulphur in these varieties is, you will see, as follows:—

Sulphur in Coal.

No. of Samples Analyzed.	Source.	Mean per Cent.
36	Wales	1·43
18	Newcastle	1·24
28	Lancashire	1·44
8	Scotland	1·11
7	Derbyshire	1·01

In this table the figures in the right-hand column represent the mean per-centages of sulphur in the various descriptions of coal, and you will observe that in no case does this per-centage rise above 1·5 nor fall below 1·0. In fact, the sulphur varies to a very slight extent, and we may safely take the mean of these results, or 1·25, to represent the average amount of sulphur present in any particular description of coal.

This 1·25 per cent. does not appear to be a very formidable amount; but when dealing with large quantities of a substance like coal, it becomes of considerable importance, representing something like 28 lbs. of sulphur per ton—a quantity far too considerable to be ignored, for, although we may consider with perfect safety that at least a half—probably much more than a half—of this sulphur, that is to say of the 28 lbs. per ton, is left in the residue of coke after the destructive distillation of the coal in the retort, yet if only one-fourth of it be converted into sulphuretted hydrogen, it would be equal to about 75 cubic feet of this gas for every ton of coal distilled, a quantity of an impurity far too large to be left out of consideration.

The origin of the sulphur is not far to seek. We find running through all coal-seams veins of a glittering brass-like mineral, which has received the name of iron pyrites, and is a compound of sulphur and iron. When it occurs in exceptionally large quantities in coal, the coal in which it so occurs goes by the technical name of coal-brasses. The origin of this iron pyrites may possibly have been the deoxidation of sulphate of iron by a large amount of organic matter. I say possible cause, for the probability lies rather in the direction of it having had an entirely extraneous origin, more especially as it is found in layers or veins, and does not occur diffused throughout the mass of coal.

Coal-brasses have an interest attaching especially to themselves, as in some cases it is found profitable to treat them, in order to utilize the pyrites which they contain irrespective of the presence of coal. For this purpose they are exposed in layers to the action of moist air. The sulphide of iron is by this means oxidized into sulphate of iron at the expense of the oxygen of the air, the coal becomes disintegrated, and on lixiviating the mass with water and evaporating the liquor so produced, a crop of crystals of the ordinary green vitriol or copperas of commerce is obtained. The pyrites also has itself, apart from its presence in coal, a great interest, inasmuch as it is used very considerably in the manufacture of sulphuric acid, the pyrites for this purpose principally being obtained from Spain, where a rich variety is found, containing from 40 to 50 per-cent. of available sulphur.

Before passing on to consider the various combinations into which this sulphur enters during the distillation in the gas-retort, I think it will be advisable if we look at a few of the general properties of the element itself; because, although it occurs in coal in combination with iron, this union is very rapidly destroyed, and the sulphur, *per se*, becomes the starting-point for all those various combinations in which it is afterwards found.

Chemists are in the habit of classing substances and elements together from their particular point of view, not as the Physicist, who would place them together according to their similarity in physical properties; nor as the Geologist, who would regard them in the light of their occurrence in nature; nor even as others, who would catalogue them in respect to their various applications to industrial purposes; but the chemist, leaving out of consideration all other matters, regards them entirely from a knowledge of their chemical characteristics—their chemical nearness or likeness, so to speak—and sometimes, in this manner, bodies between which there appears to be no similarity in most repects are brought into juxtaposition. This is so especially in the case of sulphur and another element, oxygen. Viewed in most of their aspects, nothing could apparently be more different—in the one case, the yellow, solid, brittle, inflammable sulphur; and in the other, the light, transparent, gaseous, uninflammable oxygen. Notwithstanding this wide separation in physical properties, their chemical alliance is very great and very extraordinary; and I would now examine with you some of the combinations of sulphur by the light of a few of these points of analogy, believing that this knowledge will sometimes be found useful to those connected with gas manufacture, both in the overcoming of difficulties and in the explanation of seemingly otherwise strange reactions. Prefacing the following remarks, by observing that of the two elements oxygen is by far the most energetic, the various actions, therefore, which take place in its case generally do so at a lower temperature than that required for the corresponding sulphur actions; yet this in no way interferes with our power of predicting with tolerable safety the action of sulphur under certain conditions, if we are already acquainted with the behaviour of oxygen under similar circumstances.

The following facts may be taken as typical:—If hydrogen gas or a hydrocarbon be burned in air or free oxygen, the hydrogen unites with a portion of the oxygen to form a compound of the two, which is known to us as water. On analysis, this water is found to contain two equivalents of hydrogen to every one equivalent of oxygen, and may thus be expressed by the formula H_2O. Here is the operation going on. Within this cylinder is burning—in fact, has been burning for some hours—a small jet of ordinary coal gas. The cylinder, being open top and bottom, is plentifully supplied with fresh air; the hydrogen contained in the coal gas has in burning united with the oxygen of the atmosphere, and the result is a copious deposition of water on the sides of the cylinder.

In the same way hydrogen may be burned in sulphur vapour; but the experiment is one not suited for the lecture table, and I shall have to content myself with showing you a slight modification of it. Thus, instead of burning the hydrogen directly in the vapour of sulphur, if I pass some hydrogen over a small portion of the heated element, we shall obtain the same result—that is, a union of the hydrogen with the sulphur to form a gas—sulphuretted hydrogen. On examining this body (sulphuretted hydrogen) it is found to contain two equivalents of hydrogen for every one of sulphur, corresponding then, to the symbols H_2S. I will now endeavour to perform the experiment. Here are two bulbs, the first of which contains a small quantity of sulphur, and the second a solution of a lead salt, which, as you are aware, will immediately become blackened if there be any sulphuretted hydrogen present. I will pass over the sulphur a slow current of hydrogen gas, causing it at the same time to bubble up through the second bulb, and on gently heating the sulphur contained in the first, in a short time you will perceive a blackening of the lead solution, thus evidencing the formation of sulphuretted hydrogen by the direct union of the two.

There is, further, a possibility of effecting a combination of hydrogen with oxygen, containing twice as much oxygen as water, represented by the formula H_2O_2—per-oxide of hydrogen. In the same manner there is also a possibility of producing a compound H_2S_2—per-sulphide of hydrogen—containing twice as much sulphur as sulphuretted hydrogen. Both these bodies are unstable, readily decomposing into water and oxygen on the one hand, and into sulphuretted hydrogen and sulphur on the other.

Again, when certain metals—iron, for instance—are exposed to moist air, a surface action takes place, and the metal becomes partially oxidized, this oxide, in the case of iron, being familiar to us as rust. This piece of iron was originally bright, but having been thus exposed, is now, as you see, covered with this red coating of rust. On the other hand, if we expose certain metals to the action of moist sulphur, the same thing will take place, merely substituting sulphur for oxygen. I hold in my hand some pieces of silver which have been placed in water containing a small quantity of sulphur; the sulphur has gradually (the action taking place more slowly than in the former case) attacked the silver, and it is now covered with a coating of sulphide of silver. Both these actions—that is to say, the action in the case of iron, and the similar action in the case of silver—have taken place at ordinary temperatures, the temperature of the atmosphere, but they will both take place with greater rapidity, and with very much more energy, at an elevated temperature. In the case of oxygen, if the temperature be sufficiently raised, there comes a point when the gas unites with the metal with such great energy that both light and heat are evolved, combustion taking place, although the result is in most cases the same whether it be brought about at a high or a low temperature. I may take this iron again for our experiment, and although the combustibility of iron is a result not generally contemplated, notwithstanding its being as much a combustible as coal—capable, that is to say, of being burned and of performing work by its burning—if I take this piece of iron and heat it up to a white heat by means of a jet of our hydrogen gas (I may here call your attention to the darkening of this solution caused by the sulphuretted hydrogen produced by the combination of the hydrogen and sulphur in our first experiment), and then direct upon it a jet of oxygen, the union of the metal with the gas, or, in other words, its oxidation, is evidently in this case a combustion. These iron nails are now at a white heat, the metal apparently boiling, and on allowing a jet of oxygen to play upon the surface of the molten mass, this brilliant deflagration evidences to you the very considerable energy which may attend the oxidation of metals at high temperatures.

Turning now to the analogue sulphur, we find that in its case also an elevation of temperature increases its activity, and thus the combinations into which it enters are brought about with much more ease and rapidity, until at its boiling point some metals will even burn in its vapour, giving rise at the same time to a sufficient amount of force as to raise them to a state of incandescence. There is at the bottom of this glass globe a small quantity of boiling sulphur, kept in this state by the heat of the lamp underneath. You see that the whole globe is at present filled with the dark red vapour of the element; on introducing a piece of thin copper, the copper burns with considerable vividness, being converted at the same time into sulphide.

The oxidation and sulphurization, then, of metals increases in activity and energy as the temperature is raised.

Further, carbon unites directly with oxygen to form a gaseous compound of the two—dioxide of carbon—a product containing two equivalents of oxygen and one of carbon. It is represented by the formula CO_2. Whenever carbon burns in air or free oxygen this result is effected (sometimes when carbon is burned in a limited supply of air or oxygen another and a lower oxide is produced, carbonic oxide (CO), but as its sulphur analogue has not been identified with certainty its consideration is omitted): the carbon becomes converted into carbonic acid, or dioxide of carbon, as one would prefer in this case to call it. There is no difficulty whatever in causing carbon in any form to burn rapidly in oxygen, and thus if I introduce a piece of ignited charcoal into this globe of oxygen gas, the charcoal continues to burn vividly until either the oxygen or itself has been consumed. This result is, of course, obtainable whether we plunge the combustible into an excess of oxygen, as I have done here, or whether we pass a current of oxygen over a surface of the burning material. Thus, in this glass tube there is a small piece of charcoal just ignited, and when I drive a slight current of oxygen over it, its burning will continue, and the product of combustion, together with the excess of oxygen, will be carried along

the tube. The oxygen has now reached the charcoal, as we see by its greater liveliness in burning, and if I place a little lime water in this jar, into which the end of the tube is dipping, in a very few seconds you will perceive that the lime water becomes turbid, owing to the conversion of the soluble lime into insoluble chalk by the union of the produced carbonic acid.

I have called your attention to this modification of the experiment in order that the strict analogy in the case of sulphur may be more apparent; carbon may be caused to burn directly in sulphur vapour, but only by the continued application of extraneous heat. An easier way of inducing combination between the two is by passing a current of sulphur vapour over a layer of red-hot carbon, when the carbon and sulphur unite to form disulphide of carbon, a body somewhat analogous to its prototype dioxide of carbon. Disulphide of carbon is represented by the symbols CS_2. The action has been going on in this heated porcelain tube. The charcoal with which it is filled is and has been for some time red hot. At the commencement of the lecture I introduced into the cooler portion of the tube a small piece of sulphur; the sulphur has gradually distilled, and its vapour has passed over the surface of the red-hot carbon, the produced disulphide falling into this cylinder of water placed to receive it. There are already some drops of the heavy liquid at the bottom which you will be able to see, and the action will go on until the sulphur vapour becomes exhausted. This process on an enlarged scale is the one by which disulphide of carbon is produced commercially. Pyrites often being used as the source of the sulphur, and a surface of coke acting for charcoal. You will readily conclude that this is the action which takes place in the gas-retort by which disulphide of carbon is produced and sent into the gas.

When the coal is distilled, the temperature gradually rises from the commencement to the end of the operation, the charge being kept comparatively cool during the earlier stages by the rapid and constant evolution of gas, for while gas is coming off in any abundance you will never find the temperature rise to any great height, but so soon as this evolution of gas begins to slacken the temperature soon rises to a sufficient degree to fuse the pyrites which is contained in the coal, and to drive off a portion of its sulphur, the fused sulphide spreading at the same time through the mass of semi-coke, thus:

$$3\,FeS_2 = Fe_3S_4 + S_2.$$

The temperature still rises until a somewhat higher point is reached, when a further quantity of sulphur is driven off from this sesquisulphide of iron. $Fe_3S_4 = 3\,FeS + S$, and if there be any pyrites unacted upon by heat the following action results:—

$$2\,FeS_2 = 2\,FeS + S_2.$$

Both these actions take place much more readily in an atmosphere of hydrogen or marsh gas, doubtless from the more ready volatilization of sulphur in other vapours and gases than in its own. This latter liberation of sulphur takes place in the interior of a red-hot mass of coke; in fact, no more favourable circumstances could be desired for the production of disulphide of carbon than these, and we are thus able to account for the fact that residual sulphur is found in much larger quantity in the gas distilled at the end of the charge than at the beginning. The whole of the first and probably the larger portion of the second evolution of sulphur is found combined with hydrogen in the form of sulphuretted hydrogen, the temperature required to bring about this reaction being comparatively low, as indeed you saw in one of our early experiments. In fact, the whole or nearly the whole of the disulphide of carbon which does find its way into the gas comes, in all probability, from the latter equivalent of sulphur, which, as we have seen, is in this way given up by the sulphide of iron.

The means for the removal of sulphuretted hydrogen are so well known, and, withal, so successful, none of this impurity appearing in the purified gas, that I need not even mention them; but with regard to the disulphide the result is different, its removal hitherto baffling all attempts, and, as a consequence, it still appears in the distributed gas. The methods which have been suggested for its removal are either so unsatisfactory as to make their adoption almost useless, or so impracticable as to render their introduction impossible.

That the residual sulphur present in coal gas exists in the form of disulphide is shown by its capability of forming a salt of definite composition, with either a solution of tri-ethyl-phosphine or alcoholic potash. If coal gas containing about 30 grains of sulphur per 100 cubic feet be passed through a solution of the latter body, the whole of this residual sulphur is removed, and a salt of definite composition is found in solution, containing the elements of alcoholic potash, *plus* the elements of disulphide, thus:

$(C_2H_5)KO$	+	CS_2	=	$COS_2,(C_2H_5)K$
Alcoholic potash.		Disulphide of carbon.		Ethyl-disulpho-carbonate, or xanthate of potash.

Here is a specimen of this substance crystallized in these beautiful feathery scales, and here also is a solution of it characterized by its giving a brilliant yellow precipitate with a salt of copper.

Let me now, in order to complete my story, detain you for a short time while I mention a few of the properties of this body, disulphide of carbon, although I doubt not you are familiar with most of them. In the first place, it is a very volatile liquid, readily assuming the form of vapour at ordinary temperatures, its boiling point being as low as 118° Fahr., or nearly 100° lower than the temperature of boiling water; so volatile is it that, like ether, if a few drops be placed upon the hand, a sensation of great cold is produced on account of the abstraction of the necessary amount of heat required for the liquid to become vapour. This cold may be rendered so great as easily to freeze water. If I place a watch-glass containing a few drops of disulphide on the top of this stool, the surface of which has been wetted with a little water on blowing upon the surface of the liquid, to promote its evaporation with a pair of ordinary bellows, the temperature will fall so low as eventually to freeze the glass and stool tightly together; in fact, this effect has already taken place, and I am now able to hold up the stool by the glass in virtue of the thin layer of ice between them.

Another interesting property of this body is its extreme refractive and dispersive action upon light, its effect in this direction causing it to be used with advantage in splitting white light up into its component colours. For this purpose the liquid is contained in hollow glass prisms, through which a thin slice of light is sent, the spectrum produced in this manner being a very long one, on account of the great dispersive power of the disulphide. Coupled with these two properties may be mentioned its diathermanous character—viz., that property of allowing rays of heat to pass through it with very slight absorption, In this matter disulphide of carbon may be placed before any other substance.

The inflammability of the disulphide is well known, its combustion being attended with the production of sulphurous and carbonic acids, the sulphurous acid being rapidly oxidized into sulphuric acid, the injurious nature of the presence of this impurity in coal gas being due to this latter result. There can be no question that the sulphurous acid formed during the combustion of coal gas is almost immediately oxidized into sulphuric acid, more especially as the production of water takes place simultaneously. I may show you this result. If I take the small quantity of water which has collected from the combustion of our small jet of coal gas in this cylinder (1st experiment), and add to it a few drops of hydrochloric acid, which will prevent the precipitation of a sulphite, and then a few drops of a barium salt, this white precipitate declares to you the presence of sulphuric acid in this condensed water, produced by the burning of the residual sulphur present in the Manchester gas.

The vapour of disulphide is extremely heavy, its specific gravity being 2·6; this extreme weight allows us to perform one or two curious experiments, the vapour being poured from one vessel to another, or down an inclined plane or trough, without any considerable admixture of air.

The commercial use of this volatile fœtid-smelling liquid is that of a solvent for fats, gums, resins, and essential oils, the readiness with which, after it has performed its work, it may be got rid of by distillation giving it a great advantage in this direction; it also dissolves certain of the elementary bodies, such as phosphorus, sulphur, iodine, &c. I believe gas engineers are in the habit of taking advantage of its power of dissolving sulphur, in the estimation of the amount of that element contained in oxide of iron after exposure in the purifiers. Although dissolving these various substances, it is itself insoluble in most liquids and is unabsorbed by most solids, and this constitutes the great difficulty to be met with when the question of its removal from coal gas is encountered.

For many years attention has been directed now and again to plans put forward to prevent its production or to facilitate its removal from the gas. Recently these efforts have been strengthened on account of the pressure brought to bear upon gas companies to prevent its delivery in the gas. If I might be allowed to venture an opinion, I would say that a plan to prevent its *formation* in any quantity would be the most valuable and economical, and I believe it not to be impossible that such a plan may be devised.

Two suggestions which have some bearing in this direction have already been made, the first being put forward in a definite and complete form for the first time by Mr. Vernon Harcourt, in a lecture delivered in the Royal Institution, London, on the 19th of last April, entitled, "The Sulphurous Impurity in Coal Gas, and the Means for its Removal." Mr. Harcourt's proposal being that the gas at some stage of its production, and before its distribution, should be passed through tubes heated to redness, when the following action takes place:—

$$2\,CS_2 + H_{10} = \underset{\text{Acetylene,}}{C_2H_2} + 4\,H_2S,$$

viz., the hydrogen contained in the gas, combines with the carbon of the disulphide to form acetylene or some analogous hydrocarbon, while another portion of the hydrogen unites with the sulphur to produce sulphuretted hydrogen, which may be dealt with in the ordinary way. Another explanation of the same result, and probably one that would represent more correctly the action taking place on the large scale, may be seen from the following equation:—

$$CS_2 + 2\,H_2O = CO_2 + 2\,H_2S,$$

this latter decomposition occurring at a lower temperature than the first, and there being always a sufficiency of water vapour present in coal gas. The former experiment has been going on in this tube during the lecture. Carefully dried hydrogen charged with a minute quantity of the vapour of disulphide is passing through this heated tube into a solution of lead; the blackness of the previously clear solution indicates to you the abundant presence of sulphuretted hydrogen produced according to the first equation. Here also is the fellow experiment, where coal gas containing no sulphuretted hydrogen is found, after being submitted to heat, to contain an abundance of it. All previous attempts to re-heat large quantities of gas have, however, hitherto been coupled with a serious diminution of illuminating value from the decomposition of its more luminous constituents, but the experiments which Mr. Harcourt has been able to perform have convinced him that it is possible to attain the desired result without this loss, perhaps even with a slight gain, and the following figures obtained by him from experiments performed at the Oxford Gas-Works declare this to be the case; four of these experiments giving the following results:—

	Before Heating.	After Heating.
Coal gas contained..	30 grs. per 100 cub. ft. ..	5·1 grs. per 100 cub. ft.
" " ..	30 " " ..	5·3 " "
" " ..	30 " " ..	6·1 " "
" " ..	30 " " ..	6·2 " "

The gas in this case was passed through an iron tube packed with turnings, the whole heated to redness.

The illuminating power of the gas originally was equal to 15 candles. After passing through the above-mentioned tube, heated to low redness, no change took place, the photometer readings giving respectively 15·04, 15·01, and 15, but on raising the tube to bright redness, a slight but distinct increase in luminosity took place, the result being equal to 16·66 candles. It need hardly be said that a successful and economical application of this result would leave very little to be desired.

Some ground for supposing that coal gas on its submission to a high temperature may be increased in luminosity is gathered from a knowledge of the fact, that marsh gas and olefiant gas are partially converted into acetylene by great heat, although another and a larger part of them is decomposed into their elementary constituents, hydrogen and carbon. Coal gas contains, as you are aware, usually from 50 to 80 per cent. of marsh gas. I am able to show you this effect by taking advantage of our most convenient source of intense heat —the electric spark. These two tubes contain, as you perceive, equal volumes of marsh gas. I have an arrangement for passing through one of them a series of sparks from an induction coil, and on doing so you speedily notice the volume of gas to increase, this increase continuing until the gas has nearly doubled its volume; a deposition of carbon taking place, you observe, at the same time, yet on now igniting the two samples of gas from these jets, that one which has thus been submitted to heat, and has increased its volume, having at the same time lost a portion of its carbon, is seen to be of considerably greater illuminating value than the original gas—a result, doubtless, due to the formation of a small quantity of the highly luminous hydrocarbon acetylene. We are thus led to infer that a small quantity of such a highly luminous body diffused through a large mass of poor, or negative gas is more than equal to a similar quantity of gas fully charged with, or made up entirely of, the ordinary luminous hydrocarbons. The importance of an accurate knowledge of the different temperatures at which these various hydrocarbons are produced is here clearly shown.

Further; we may conclude that the action of heat upon these hydrocarbons is destructive up to a certain point—that is to say, tends to separate the hydrogen and carbon from each other, until the residual gas is all or nearly all hydrogen, and the carbon deposited in the solid form; but at a higher temperature hydrogen will again enter into combination with carbon to produce in this case acetylene and benzole vapour, acetylene being one of the few bodies produced by the direct union of its elements, and both of them being highly valued for the great luminosity of their flames. This union does not take place with pure elementary carbon, unless the temperature is exceedingly high, in fact, almost the highest attainable; but the carbon deposited from the heated marsh gas is not such carbon, but is itself a highly condensed hydrocarbon, much more easily acted upon by hydrogen. Berthelot has found that marsh gas submitted to heat may even have four-fifths of its bulk converted into acetylene—provided the acetylene be removed as it is produced, according, as he believes, to the following reaction:—

$$2\,CH_4 = C_2H_2 + 3\,H_2.$$

It may be remembered here that although the luminosity of a flame is mainly due to the finely divided carbon present in its interior, yet that nevertheless the temperature to which this carbon is raised, or, in other words, the heat of the flame, is of considerable importance, so much so, that in some cases the presence of a less *quantity* of carbon is made up for in the illuminating value by the higher temperature to which the remainder is raised. Before leaving this subject, I may incidentally remark that these valuable hydrocarbons are to a very perceptible extent soluble in water, the scrubbing of gas with which, therefore, should be done with care; also, some condensible bodies, such as naphthaline, have the property of absorbing acetylene, and some of its polymers,

so that a gas may really be weakened by passing over a surface of such a substance.

The second of the two suggestions dealing with the destruction of the disulphide of carbon at the moment of its formation in the retort was made by Dr. Odling, in his recent exhaustive lecture "On Sulphide of Carbon," delivered before the British Association of Gas Managers, in London. Taking advantage of a reaction which I have already mentioned—viz., the decomposition of disulphide by steam at a moderate heat—Dr. Odling suggests the introduction of a small quantity of that body into the retort at the latter part of the distillation, or at that period when it shall be known that the greater portion of the disulphide is being produced. The experiment is a very simple one, and there would seem to be no great difficulty in carrying it out. The introduction of steam would, of course, have to be done judiciously, so as not to dilute the gas with too much hydrogen or carbonic oxide, and also to avoid such an excess as to interfere with the condensation. I should say that probably there would be a slight drawback, arising from the increased quantity of sulphuretted hydrogen—not from the decomposed disulphide, for this amount would be extremely small, but from the conversion of that sulphur which at present remains in the coke into sulphuretted hydrogen by the action of the steam; nevertheless, this might be considered a very small evil if the destruction of the disulphide was successfully accomplished, a result which we have every reason to believe might be attained. I have here an experiment which was exhibited in support of this result at the above-mentioned lecture. This iron tube is filled with a description of coke such as would be found on the bed of the retort, near the close of the distillation. The tube is, as you see, heated to redness, but in the gas which is coming off you note very little sulphuretted hydrogen; but now, on passing over the coke a little steam from this boiler, sulphuretted hydrogen is produced in abundance, presumably obtained from a portion of that sulphur which either was—or very soon would have become—a constituent of disulphide of carbon.

The interesting and successful plan for the removal of disulphide of carbon by the proper application of foul lime was also, I believe, first suggested by Dr. Odling, and it must be so thoroughly familiar to you, since the lecture containing the account of it has been published, that I shall only cite it here as a further illustration of the analogy existing between sulphur and oxygen, and also as an instance in which one impurity is made the means for the removal of another. The previous removal of carbonic acid (the gist of the proposition) will allow of the sulphuretted purifiers being kept as foul as possible, in which state they are the most active in removing the disulphide of carbon, oxide purifiers never, of course, being placed before lime purifiers.

Although the amount of impurity to be removed is exceedingly small, the purifying surface will doubtless have to be great in order to give very satisfactory results, for, paradoxical as it may appear, it is sometimes easier to remove a considerable quantity of a body from a gas than even a minute trace; indeed, it may even be doubted whether this latter result is possible. Caustic potash, whose absorptive power of carbonic acid is so great that pure carbonic acid may be bubbled through it with some rapidity without a trace escaping, is utterly incompetent to remove small traces of the gas if diffused through a large mass of air or other negative material. I am speaking, of course, only with regard to such gases as are insoluble, or only slightly soluble, in water.

During the preceding remarks, I have had occasion several times to refer to the subject of temperature, and it would seem to me that the importance of this subject is by no means overrated. At present our knowledge of the quantity and quality of gas, and the amount and character of the various impurities produced at different temperatures, is very small. I would mention a few facts which are known generally to depend upon a high or a low heat, but with regard to which even an approximation to the temperature at which it becomes more or less profitable to obtain, or to prevent the obtaining of, these results is not known, thus: Disulphide of carbon is certainly not produced at a low temperature; this is well shown in the small amount of residual sulphur found in gas made by Eveleigh's method, a process worked at a low heat; therefore, we may expect to find the largest quantity of residual sulphur (disulphide) produced when the coal is carbonized at a high temperature, a result borne out by practical experience. Again, the maximum quantity of gas is obtained at a high heat, but the maximum illuminating power at a comparatively low one. Now, although we do not know the changes by which the coal is converted into the various hydrocarbons present in coal gas, the knowledge of the character of the hydrocarbons obtained at various temperatures cannot fail to give us some light upon this matter.

This partial ignorance is due, I believe, in great measure to the lack of any means whereby the required heat may be measured with ease and accuracy, and I have brought this matter before you in closing, because I think the requisite instrument may be at hand in the form of a new pyrometer, the invention of Mr. C. W. Siemens, F.R.S. Pyrometers there have been in number, but they have all had serious disadvantages either in the matters of application, manipulation, or accuracy. This instrument which I hold in my hand is constructed on the principle that the resistance offered to an electric current by a wire through which it is passing increases proportionately to the temperature of the wire. Mr. Siemens has, by a series of very careful observations, determined this relation, and now, therefore, if the resistance of the wire be estimated at any particular temperature, the value of that temperature may easily be calculated from the measure of resistance so obtained. It would be out of place here, and at this time, to go more into detail regarding the application of this principle. I should have liked to have shown you the instrument in action, but must content myself with just bringing it under your notice; suffice it to say that the recording instrument consists of two voltameters, the electric current is divided into two parts, one half of it, after passing through a constant and known resistance, being connected with one voltameter; the other half, passing through the pyrometer wire, whose varying resistance is to be measured, is connected with the second voltameter. An observation is made by observing the relation which the volume of gas contained in one tube bears to the volume in the other (Faraday having shown that the volume of gas obtained in a given time was inversely governed by the intensity, which in its case depends upon the resistance), this relation giving the necessary data for the calculation of the temperature. In this form of the instrument, the wire—a spiral of platinum—which is to be exposed to the heat to be measured, is enclosed in an iron tube through which leading wires are taken to afford the necessary means of communication, the pyrometer having this advantage, that the recording instrument may be placed at any distance from the furnace, most of the old pyrometers, notably the one on the principle of specific heat, requiring the operation to be performed in close proximity to the source of heat to be measured. The form of this instrument is, I believe, arbitrary, and may be made to suit any particular kind of work; its readings are accurate when it is used in gas-retorts, as I have had the opportunity of testing, and a committee of the British Association reported very favourably upon its permanent accuracy last week at Brighton.

In conclusion, gentlemen, I have to thank you for your kind attention to this somewhat fragmentary lecture, and to express a hope that although I have brought nothing very new before you, yet that the application of a few of the facts and suggestions which have been under our notice to such matters with which you are daily familiar may not be altogether without its measure of good.

The President said, on behalf of the members of the association, he desired to return Mr. Wills their warm thanks for his gratifying lecture. There was not a gentleman present who was not greatly pleased, and many who were away when they heard of the excellence of the lecture, would regret their absence. He begged, on behalf of the association, to return Mr. Wills their hearty thanks.

Mr. Wills acknowledged the compliment, and the proceedings terminated.

British Gas Company, Limited.—At the half-yearly meeting of this company on the 25th ult. a dividend at the rate of 10 per cent. per annum was declared.

Rio de Janeiro Gas Company, Limited.—The directors of this company announced the payment, on the 4th inst., of an *ad interim* dividend at the rate of 10 per cent. per annum, free of income-tax, for the half year ending June 30 last.

Cagliari Gas and Water Company, Limited.—The directors of this company have given notice that on and after the 3rd of October inst. the holders of scrip shares of this company will, on presentation of the coupons for the first six months of 1872 at the London and Westminster Bank, St. James's Square, S.W., receive payment of the interim dividend declared for that period, at the rate of 5 per cent. per annum, or 10s. per share, less income-tax.

The Gas Question at Uttoxeter.—The directors having given notice that they intended to raise the price of gas 1s. 3d. per 1000, a public meeting was recently held, and a deputation appointed to confer with the directors on the matter, with the view to a reduction. A meeting of the directors and the deputation subsequently took place, when the directors agreed to raise gas 5d. per 1000 feet; the present price, therefore, will be 5s. 5d.

The Birmingham and Staffordshire Gaslight Company *v.* Ratcliff.—The award of Mr. S. B. Bristowe, Q.C., M.P., the arbitrator appointed by the court in this case, has now been made, and under it the defendant is ordered to pay to the plaintiffs the sum of £273 15s. 10d., in addition to the £150 already paid into court by him; and he is also ordered to pay all the costs of and incidental to the arbitration.

Death of the Chairman of the Ratcliff Gas Company.—We regret to have to announce the death, on the 25th ult., of Mr. Andrew Wilson, the esteemed chairman of the Ratcliff Gas Company. Mr. Wilson had ably filled his office since the decease of the late Mr. Goodhart, about four years ago. He had been in failing health for some little time, but his death was quite unexpected. He was 57 years of age.

The Great Robbery at Cork.—Our Southampton correspondent telegraphs that William Collins, a clerk of the Cork Gas Company, who absconded last month with £4000, has been traced to have left Southampton for Baltimore, United States, on Monday last. The American authorities have been communicated with, and Collins will be apprehended on his arrival at Baltimore.—*Echo.*

Something Unusual.—In the Scotch papers we find a report of a rather remarkable meeting of Wishaw miners. The men voluntarily refuse an offered advance of 1s. a day, because, since the last advance on their wages, the coal-masters have advanced the price of coal 7s. per ton! In the circumstances—the men being unwilling to underlie the imputation of having unduly raised the price of coal—they unanimously agreed to a resolution to the effect—"That the masters be asked to take the last advance off the price of coal, and take back the shilling."

Lighting of the Thames Embankment.—On Tuesday last, by direction of the Metropolitan Board of Works, the lamps on the river wall of the Victoria Embankment were lighted for the first time. The standards for the lamps, which present a handsome and classical appearance, have been cast from designs furnished by Mr. Vulliamy, the architect to the board. It is stated that the United States Government have determined to erect lamps of the same pattern in front of the Treasury at Washington. The original drawings, the castings, and core boxes of the lamp standards have been lent by the board to the American Government, in order that the work might be facilitated. The lamps on the Albert Embankment will be lighted shortly.

Advance in the Price of Gas at Rhymney.—A meeting of gas consumers was held on the 27th ult., at Pontlottyn, for the purpose of considering the above subject. The chair was taken by Mr. L. Williams, and several of those present suggested various plans, the most prominent of which was to have a works of their own erected. The following resolution was ultimately put to the meeting, and carried:—"That as the Rhymney Gas Company have issued a notice of an advance of 9d. per 1000 in the price of gas, we, the tradesmen of Pontlottyn, object to such advance, but taking into consideration the great rise in materials and labour, we are willing to agree to an advance of 6d. per 1000." This resolution will be submitted to the directors at their next meeting, and if the request is refused, the tradesmen, it is said, will endeavour to establish a limited company themselves.

Economy of a Gas-Stove.—Economy in coal has become a necessity when it has reached 35s. a ton, and is certain to touch the £2 before Christmas, especially if we have a severe winter. I will give the results of my own experiments during the last six months. For the last five months I have not used 1 cwt. of coal, and I have had a family of four persons at home, and nearly all the washing and all the ironing had been done at home—the total cost to me has been for the six months, £1 10s. I purchased, at an expense of 4s. 6d., a gas-stove, and have found that even with one, although I prefer two, I could arrive at the following:—Breakfast was always ready in a quarter of an hour from time of lighting stove, consisting of tea or coffee, and bacon or eggs. The servant was saved the time taken by lighting and cleaning fires and fire-places. All the water needed during the day was boiled, and any dinner prepared, with the exception of roast meat, and always two vegetables, or one and pudding. Then, for ironing, every one who has used my stove for this purpose say they never had their irons hotter or cleaner. I have known a month's ironing for two ladies and myself done in one day, using this stove. The only thing we could not persuade it to do was to roast meat, and, when we wanted this, we had to send it out to a bakehouse, and found it far cheaper than paying for coals.—*Correspondent of the "Echo."*

Singular Accident to a Gasholder.—At a meeting of the Oldham Gas and Water Works Committee on Wednesday last, the chairman (Alderman Whittaker) stated that an accident had occurred to the new gasholder at Hollinwood. The holder, which had been erected by Messrs. Mabon and Co., Ardwick Ironworks, was considered complete, and arrangements were made for "lifting" or testing it, before it was formally handed over to the corporation. As usual, Mr. Mabon had promised to be present, but before either he or any one connected with the committee arrived, the superintendent of the buildings now in course of erection for the committee took upon himself the task of testing the gasholder. He accordingly set the engine to work, but instead of forcing air into the holder he reversed the machine, and, as a consequence, the air already inside began to be exhausted. In a short time the gasholder gave way under the force of atmospheric pressure, and, in addition to a good deal of damage being done to the roof, a number of rods, bolts, &c., were snapped and bent. In addition to the cost of making good the damage, the accident is unfortunate from the fact that, owing to the rapid increase of gas consumption in the neighbourhood, the gasholder was required to be in requisition at the earliest possible moment.

Salford Corporation Gas-Works.—At the meeting of the Salford Town Council on Wednesday last, Alderman Platt moved—"That, as recommended by the General Gas Committee, the price of gas be increased 2d. per 1000 cubic feet from Sept. 30, 1872." He wished to explain that the Gas Committee had been fortunate in their contracts for material such as cannel and coal. Some were still unexpired, and if they had had to purchase the whole of the cannel and coal which they used at the present market price, the committee would have been compelled to come before the council and ask for no less an advance than 1s. per 1000 cubic feet if they were to clear the same amount of profit which they were now able to make. If they were compelled to supply gas at the present

rate, and gave the market price for the material, the corporation would suffer a loss of £20,000 on the amount of gas they made. Owing, however, to the fortunate circumstances of the committee having some pretty extensive contracts which had to run for something like two years, they were in a position to ask the sanction of the council for an increase of 2d. per 1000 cubic feet, and that would leave them at the end of the financial year in the same position in which they now were. Alderman Tysoe seconded the resolution. In answer to Mr. Ashton, Mr. Platt said they supplied gas to out-districts and to a variety of people under peculiar circumstances, and the resolution of the Gas Committee would apply to every one to whom the corporation supplied gas. The resolution was carried unanimously.

MANCHESTER (CORPORATION) GAS SUPPLY.—On Friday, Sept. 27, a public meeting was held in the Conservative Club Rooms, Bradford Street, Ancoats, to protest against the proposed increase of £100 to the salary of Mr. Peacock, indoor superintendent of the gas department, and also to protest against the payment of gas deposits without interest. Mr. Boughey moved, Mr. Hawkesworth seconded, and Mr. Councillor Walker supported, a resolution protesting against the increase of Mr. Peacock's salary. The grounds of the protest were that Mr. Peacock's present salary, £600, was quite high enough, and that the price of gas had been raised 2d. per 1000 feet. Mr. Councillor Woodward said he believed Mr. Peacock never sought the increase, that he never thought such a proposal would be made, and he believed Mr. Peacock had received a great deal of unjust abuse in the matter. He agreed with the motion, which was carried unanimously. Mr. Hughes moved—"That this meeting considers the time has arrived when the corporation should allow a per centage of 5 per cent. on all deposits in their hands on gas-meters." Mr. Spencer seconded the resolution, which was supported by Mr. Jackson. Mr. Councillor Woodward mentioned that the amount of deposits in the hands of the Gas Committee at the present time was £11,683, for which the corporation were getting 4 per cent. He called the system downright robbery. Mr. Councillor Shaw said if no one else brought forward a motion in the council against the present system of taking deposits without interest he would. The motion was unanimously agreed to, and the proceedings terminated.

GAS EXPLOSION AT DRIGHLINGTON.—On Monday morning, Sept. 30, an explosion of gas, which fortunately was not attended with fatal consequences, occurred at the mill of Messrs. Smith, Denby, and Co., worsted spinners and manufacturers, Drighlington. It appeared that a new service of gas is in course of being fitted up for the purpose of having an independent supply for lighting the yard. With this view a new connexion was being made outside, communicating with a room in which the meters are kept. Either from oversight or neglect, a plug had been omitted to be put in one end of the pipe, and a large escape of gas had occurred. Entering a room inside the works, adjoining the engine-room, an extensive accumulation of gas had taken place. On Monday two men, named Thomas Precious and Walker Denby, were employed making the connexion. The former of these, in the course of his work, entered with a light the room where the gas had accumulated. An explosion immediately followed. Adjoining the room is a staircase affording communication with the different storeys of the mill. Several of the windows in this staircase were completely blown out, and others were more or less damaged. The man Precious was very severely burned on the face, head, and hands, and was otherwise slightly injured. Denby, who was on the outside, was also slightly injured. The explosion was of a most violent character, and caused considerable alarm in the immediate neighbourhood, the house close to the mill being shaken by the shock. No permanent damage was done in the mill.

TAMPERING WITH GAS-PIPES.—At the Hamilton, N.B., Sheriff Criminal Court, on Saturday, Sept. 21—Sheriff Spens presiding, Ephraim Cutler, formerly a roll-turner at Excelsior Iron-Works, near Wishaw, was charged with having, on Friday, Aug. 2, maliciously pierced several holes in the gas-pipes of the house which he occupied at Shieldmuir, so as to cause an explosion and damage the property, which belonged to Messrs. John Williams and Co. The accused had been dismissed from the service of the company, and had left the house which he occupied on the day in question. Shortly after, the neighbours detected an escape of gas, and, a search being made, ten holes were discovered to have been made in different parts of the pipes, and the gas-fitters who examined them said that under an ordinary pressure of gas an explosion would certainly have been the result if a light had been used within a quarter of an hour after the holes were pierced. The gas, fortunately, had been turned off during the night at the works. Several witnesses deposed to hearing the accused threaten to blow up the place. For the defence, witnesses were called who deposed to seeing several lads get through the back window of the house after the accused had left it, and it was contended, on his behalf, that these lads had tampered with the pipes. The Sheriff said that, although there was strong circumstantial evidence of the prisoner's guilt, still there was a reasonable possibility, assuming the theory for the defence to be correct, that the house might have been entered and the gas-pipes destroyed by other than the accused. In the circumstances, therefore, he dismissed him from the bar.

DR. STEVENSON'S REPORTS ON THE ILLUMINATING POWER OF THE GAS SUPPLIED IN ST. PANCRAS FOR THE PAST QUARTER.—The maximum illuminating power of the gas supplied by the Imperial Company during the month of July was, according to my observations, 14·5 standard sperm candles, the minimum 12·6, and the average 13·7 candles, tested according to the requirements of the Metropolis Gas Act, 1860. The gas was apparently below the usual quality as regards illuminating power. Some allowance must, however, be made for the excessive temperatures at which the gas was measured; the gas, owing to the heat of the weather, was measured at temperatures which frequently reached 80 to 90 degrees, and the difference of temperature between the average temperature of 60 degrees and 80 degrees reduces the apparent illuminating power of the gas by about half a candle. Yet, making due allowance for this, I have to report that during the last three months the gas supplied has decreased in illuminating power. As regards impurities, there is an improvement this month, the total amount of sulphur per 100 cubic feet having fallen to 18·63 grains. Sulphuretted hydrogen was never detected. Ammonia was invariably present, though never in excess. During the months of August and September the average illuminating power of the gas was 14 standard sperm candles; the maximum was 15·2, and the minimum 13·4 candles. Although this is a more satisfactory return than the last month, yet I have to remark that during the summer and autumn months, coals having been very dear, the gas has generally been of a lower illuminating power than before the rise in the price of coals. The requirements of the Imperial Gas Act are, however, not transgressed. Of impurities, ammonia was always present in small quantities, sulphuretted hydrogen was never detected. Sulphur, in various forms, was present to the extent of 22·6 grains per 100 cubic feet.

DEWSBURY AND BATLEY GAS SUPPLY.—At the meeting of the Dewsbury Town Council on the 1st inst., Mr. Firth moved that an application should be made to Parliament during next session for a bill to enable the corporation to erect gas-works, to purchase (along with Batley) the works of the Dewsbury and Batley Gas Company, and to supply the borough with gas. Mr. Wooler seconded the motion, which was carried, but not until fault had been found with the gas company for creating new share capital, which they intended, if the works were bought, should be reckoned as paying 10 per cent. per annum. At the Batley Town Council, on Thursday, the 3rd, a proposed application to Parliament for a bill to enable the corporation to erect gas-works, and along with the Dewsbury Corporation to purchase the plant and works of the Dewsbury and Batley Company was moved and seconded, but was afterwards withdrawn. On the same day an extraordinary general meeting of the shareholders of the gas company was held at Dewsbury, to consider an offer from the two local town councils to purchase the works and interest of the company. There was a large attendance, and Mr. Henry Hemingway presided. A joint committee of the Dewsbury and Batley Corporations had offered £12 for £5 A shares, and £9 for £5 B and C shares, the former having interest at 5 per cent. and the latter at 7½. The meeting unanimously resolved that if the corporations would offer £12 10s. and £9 7s. 6d., they would take it into favourable consideration; and it was also agreed, with respect to a difference between the corporations and the company about the creation of new capital and the rate of interest thereon, that, as they had already had counsel's opinion, and the corporations proposed consulting another barrister, a third competent person should be called in in case the opinions clashed. It was also further resolved that, if the negotiations went off, the directors should be empowered to raise new capital for the enlargement of the existing works. The sum of £50,000 was spoken of as necessary.

PREPARATION OF STANDARD SOLUTIONS FOR ESTIMATION OF AMMONIA.—To prepare the test solutions the following processes may be used by the gas examiner:—Measure a gallon of distilled water into a clean earthenware jar, or other suitable vessel. Add to this 235 septems of pure concentrated sulphuric acid, and mix thoroughly. Take exactly 50 septems of the liquid and precipitate it with chloride of barium in the manner prescribed for the sulphur test. The weight of sulphate of barium which 50 septems of the test acid should yield is 34·27 grains. The weight obtained with the dilute acid prepared as above will be somewhat greater, unless the sulphuric acid used had a specific gravity below 1·84. Add now to the diluted acid a measured quantity of water, which is to be found by subtracting 34·27 from the weight of sulphate of barium obtained in the experiment, and multiplying the difference by 295·7. The resulting number is the number of septems of water to be added. If these operations have been accurately performed, a second precipitation and weighing of the sulphate of barium obtainable from 50 septems of the test acid will give nearly the correct number of 34·27 grains. If the weight exceeds 34·6 grains, or falls below 33·95 grains, more water or sulphuric acid must be added, and fresh trials made, until the weight falls within these limits. The test acid thus prepared should be transferred at once to stoppered bottles which have been well drained, and are duly labelled. To prepare the standard solution of ammonia, measure out as before a gallon of distilled water, and mix with it 50 septems of strong solution of ammonia (sp. gr. 0·88). Try whether 100 septems of the test alkali thus prepared will neutralize 10 of the test acid, proceeding according to the directions given subsequently as to the mode of testing. If the acid is just neutralized by the last few drops, the test alkali is of the required strength. But if not, small additional quantities of water, or of strong ammonia solution, must be added, and fresh trials made, until the proper strength has been attained. The bottles in which the solution is stored should be filled nearly full and well stoppered.—*Instructions of the Gas Referees.* [The indicator of the point of saturation is a solution of hematine, a few drops of which added to the dilute acid give it a faint yellow colour, which is turned to a bright pink by the smallest excess of ammonia.]

EXTENSION OF THE EDINBURGH GAS-WORKS.—The rapid rate at which the city has been extending in all directions, and the consequently increasing demand for the supply of gas, has forced upon the directors of the Edinburgh Gas Company the necessity of making considerable additions to their works in New Street and Canongate. In the summer of last year two new tank reservoirs were erected at Tanfield for the purpose of facilitating the distribution of gas in the suburbs of the north part of the town. Last winter the manufacturing capabilities of the New Street works were taxed to the utmost, and the existing ovens and retorts were kept in operation night and day to meet the ever-increasing demand for light. The long range of old, tumble-down buildings called Shoemakers Close, lying between the column of the works and the Canongate, were acquired by the company some time in the beginning of this year; and in May, so soon as the tenants had left the houses, operations were commenced for the removal of the buildings. These consisted of four lands extending a length of 200 feet; and in their demolition some curious knowledge was gained of this part of old Edinburgh. The houses, which must have been between two and three hundred years old, were built on the site of an ancient tannery; and Shoemakers Close was erected on forced earth. Cuttings laid bare the old tanpits, and the wood with which they had been lined was quite fresh, although it must have been embedded in the earth for hundreds of years. In taking down the buildings themselves nothing extraordinary was discovered except in one instance. The workmen, in demolishing what was long known as the Shoemakers Close Soup Kitchen, came upon the skeleton of a man carefully buried beneath the hearthstone. Conjecture, of course, was rife as to how the skeleton came there; and the only solution of the mystery is that at some remote date a murder had been committed in the house, and the victim hidden in the spot least likely to be searched. The extension of the gas-works on the ground so cleared is proceeding apace. In a line with the chimney column southwards towards the Canongate a range of stores for the stowage of gas coal is being erected. The stores are two hundred feet in length, and consist of an iron roof pitched on iron piers connected by girders, leaving both sides open. When completed the stores will be capable of holding 14,000 tons of coal, and this will increase the stowage room within the works to 25,000 tons. Eastward of this range of stores are being built a double row of ovens—twenty-five on each side. These ovens are of fire-brick, and in each oven there will be five retorts of the newest and most improved description. The ovens will be covered by iron-roofed shedding of a similar description to that of the stores, and will extend a length of 206 feet. When in full operation the 250 new retorts will enable the company to manufacture 1,348,000 feet of gas per day, in addition to the 2,500,000 feet which are made by the existing works. The whole of the new works are expected to be finished before winter sets in. Messrs. J. and R. Park are the contractors for the building work, and Messrs. Tod, Leith Walk, for the iron-work.—*Scotsman.*

THE CLITHEROE GAS COMPANY AND THE CORPORATION.—An extraordinary meeting of the shareholders of the Clitheroe Gas Company was held on the 27th ult., to consider the offer made for the purchase of their works by the Clitheroe Local Board of Health. Mr. W. B. Dewhurst, the chairman, in opening the meeting, said they were called together that evening for the purpose of considering an offer made by the Local Board of Health for the purchase of their works, and seeing that the offer had been inserted in the public papers, he hoped that the shareholders had come prepared to give to the meeting their views upon the subject. The directors had collected a great deal of information from gas companies, who had sold their undertakings to local authorities. It would be the duty of the directors to lay the particulars of their inquiries before the shareholders; but, before doing so, he wished to take that opportunity of addressing a few words to them on the subject of lighting the public lamps, upon which there seemed to be some misapprehension. The lamps and posts were the property of the corporation, and they had entire control over them, so far as fixing the size of the burners and the number of hours they had to be lighted. There seemed to be an impression on the public mind that the whole of the responsibility of lighting the town and the size of the burners rested with the gas company, which was really not the fact. He was glad to inform them that an agreement had been made with the local board to light the public lamps on the following terms—viz., 4s. 3d. per 1000 cubic feet, uniform burners No. 3, lighting, extinguishing, cleaning, putting up, taking down, and storing the lamps (141 in number), for the sum of £70. Whilst upon that subject he wished to refer to a statement made at a meeting of the Local Board of Health, held on Thursday, the 12th ult., by the town-clerk, to the effect that, at the

request of Mr. Jones, borough surveyor of Carnarvon, he had sent particulars of the supply of gas for Clitheroe, and that in reply Mr. Jones said that the borough of Carnarvon had, like Clitheroe, met with a great deal of trouble from not receiving a proper supply of gas from the gas company, and that the corporation of Carnarvon had an Act to construct gas-works and supply gas. Carnarvon had been put as a parallel case to Clitheroe, whereas the gas-works in existence at Carnarvon were the property of Mr. George William Duff Assheton Smith, and in the occupation of Mr. William Crippin, under lease; and the provisions of the Gas-Works Clauses Act, 1847 and 1871, did not apply to those works. There was no analogy between the works at Clitheroe—incorporated by Act of Parliament—and those at Carnarvon, belonging to a private individual, and without statutory powers, and therefore without a *locus standi*, in relation to the application to Parliament by the Corporation of Carnarvon. The business of the evening, however, was to consider the offer of the local board. It was for the shareholders to say whether they wished to retain the works, or to accept the offer of the board, or return the offer for amendment. He was glad to see such an attendance of shareholders, and he should be glad to hear an expression of their opinion. The income of the gas company for the year ending June 30, 1872, had enabled them to pay the maximum dividends upon the whole of the shares, amounting to £1197, and besides that they had during the past three years set aside annually £201 to the reserve-fund, making in all £1398, for which the local board offered to give annuities of 5 per cent. upon the A and B shares, 10 per cent. upon the C and D shares, and 7 per cent. upon the ordinary shares, which were equivalent to £1148 15s. per annum. After giving details as to the terms upon which gas-works in other places had been disposed of, the chairman said he considered the offer of the Local Board of Health was inadequate, and, moreover, it contrasted very unfavourably with the prices obtained by gas companies in other towns. A discussion ensued as to the desirability of parting with the gas-works at all, some of the shareholders insisting upon retaining their property. It was ultimately resolved by a unanimous vote—"That, as the terms offered by the local board are not, in the opinion of this meeting, equivalent to the value of their works, premises, and plant, having regard to the yearly income of the company, and other considerations; and looking also at the prices given by local authorities in other towns for the purpose of similar undertakings with equal prospects, that the offer of the local board be respectfully declined. The shareholders, however, being willing to sell at a fair and adequate price, take this opportunity of stating that they will be glad to receive and favourably consider an amended offer from the local board for the purchase of their undertaking."

AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS, IN SEPTEMBER, 1872.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
West Middlesex	17·97	0·043	0·147	0·001	14·0	3·3
Southwark and Vauxhall	17·37	0·097	0·128	0·003	13·5	3·4
Other Companies.						
Kent	27·77	0·011	0·235	0·000	20·0	5·4
New River	18·30	0·031	0·147	0·000	13·6	3·5
East London	17·77	0·059	0·181	0·001	13·0	3·3

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 116,677,579 gallons; and the number of houses supplied was 498,116. This is at the rate of 35·7 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 23·8 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne. HY. LETHEBY, M.B.

THE BERMONDSEY WATER SUPPLY.—A further report made to the Board of Trade respecting the recent failure in the supply of water to Bermondsey and Rotherhithe has just been issued. It shows that the complaints of short supplies made subsequent to June 16 were, in some cases, unfounded, and in most greatly exaggerated; and, if well founded, the deficient supply was entirely owing to defective fittings. According to the reports of the medical officers, the mortality in the parishes of Bermondsey and Rotherhithe was exceptionally low during the "water famine," as the newspapers called it.

FAVERSHAM WATER-WORKS COMPANY.—At an extraordinary general meeting of this company, held on the 1st inst., a resolution was passed authorizing the directors to borrow £1000 on security of debentures bearing interest at the rate of 5 per cent. per annum. The purpose to which this new capital is to be applied is the erection of a windmill so that the company may have duplicate pumping power, which is very desirable, inasmuch as, in the event of accident to the existing steam power, the town might be left without water for several days; and, further, it is calculated that wind power might be used half the year, and thus a considerable item of expenditure for coal would be saved. The estimated cost of the new works is £960.

WARRINGTON WATER-WORKS COMPANY.—The directors of this company have given notice that "In consequence of the large, but unavoidable, expenditure incurred in the construction of the new works and otherwise enlarging and extending the original works of the company, together with the increased (and increasing) working expenses which the obtainment of an abundant and constant supply of water necessarily involves, it has become necessary on the part of the directors to resort to the maximum rate of charge authorized by the Company's Act of Parliament for domestic purposes." They therefore propose, on and after the 25th day of December next, to raise the water-rent for domestic purposes from 5 to 6 per cent. per annum on the estimated rental in the overseers books, and also to alter and revise the present rate of charge for miscellaneous consumption where necessary.

DONCASTER WATER SUPPLY.—A meeting of the Doncaster Local Board of Health was held at the Guildhall on the 25th ult.—the Mayor (Mr. W. C. Clark) presiding. The Special Sewage Committee made a report relative to the water supply of the borough, and recommending an application to Parliament during the next session for a bill to enable the Town Council to take the Hooton Brook and such other of the neighbouring streams as may be necessary to secure a sufficient supply of water for the borough. Alderman Hatfield moved that this recommendation be adopted by the council, and that the special committee be authorized to take the necessary steps for giving effect to the resolution. Alderman Stockil seconded the motion, and it was supported by several members, and by the mayor. Mr. Constantine suggested that, inasmuch as the report did not go into details and gave no estimate as to the probable cost of the proposed scheme, it would be desirable to call in the assistance of some eminent engineer to report upon the practicability and the desirableness of the proposed undertaking before they committed themselves to so great an outlay. Mr. Howarth and Mr. Waite supported this view of the question. The town-clerk reminded the council that whatever they did that day would not be past recall, because before they could really do anything the matter must have the sanction of the Local Government Board, and must then come before another meeting of the council, and also before a meeting of the burgesses. Mr. Townsend moved that the report and recommendation of the committee be not confirmed, and Mr. Pearson seconded the amendment. In the course of the discussion it was pointed out that the proposed source was a good one both in point of quality and quantity. This had been amply demonstrated in the recent promotion by private individuals of what was known as the Doncaster Water Bill—a measure which, it will be remembered, came before a committee of the House of Commons last session, and was defeated through the opposition offered to it by the Corporation of Doncaster and others. It was also argued that that inquiry had indisputably proved that the spring water in Doncaster, which was that principally drunk by the inhabitants, was unfit for the purpose, and, in fact, worse than the river water; and that the time had come when something must be done towards improving the supply. After several hours deliberation the council divided, when there appeared for the motion 14 votes; for the amendment three, and three remained neutral. Mr. Townsend then moved that the town-clerk be instructed to take immediate steps for filing bills in Chancery against the authorities of those towns above Conisbro' which pollute the river Don with their sewage, for the purpose of obtaining injunctions to restrain them from so offending. Mr. Pearson seconded this proposition. Alderman Clark stated that at an important conference of the municipal bodies of Rotherham, Sheffield, Chesterfield, and Doncaster, recently held, a kind of engagement was entered into that no steps should be taken by Doncaster in this matter until the adjourned meeting, which was to be called by the Mayor of Sheffield, according to his own convenience, after the fate of Mr. Stansfeld's Public Health Act was known. The town-clerk said it would be simply impracticable and impossible to obtain an injunction against those towns, restraining them from putting their sewage into the river, so as to obtain a supply of water from that river, fit for the inhabitants of Doncaster to drink; it would be impracticable and impossible to do this in the lifetime of the present or the next generation. Mr. Shirley instanced several cases in support of this opinion, particularly the case of Birmingham, where a bill had been filed in 1853, and nothing done yet. Upon a division, Mr. Townsend's motion received the support only of the proposer and seconder. The council thus far stands committed to the Hooton Brook scheme proposed by the special committee, a scheme the cost of which is variously estimated at from £60,000 to £100,000.

THE SEWAGE QUESTION AT TORQUAY.—At a recent meeting of the Local Board of Health of Torquay, a report by Mr. W. Hawkshaw was read in reference to the disposal of the sewage of this town. Last year Mr. Bazalgette was employed to make a survey, and prepare a plan. He proposed to construct a large intercepting culvert, which would prevent all discharge of sewage into the bay, and carry it by means of a subterraneous tunnel into the depths of the sea, three miles distant from Torquay, at a rocky promontory known as "Hope's Nose." Mr. Bazalgette's estimate was £30,000. The local board adopted the scheme, which was warmly opposed by the ratepayers as unnecessarily extravagant, and it was ultimately suspended. Various plans have from time to time been propounded; and it was finally determined to consult Mr. Hawkshaw, who made a survey of the district, and held a public inquiry at Torquay. Mr. Hawkshaw gives reasons for objecting to the establishment of a sewage farm, or to any method of precipitation, with a view to render the liquid sewage innocuous before putting it into the sea, and he then proceeds to advise the adoption of Mr. Bazalgette's proposal to convey the sewage to a point sufficiently distant from the inhabitants, and to turn it into the sea in deep water, in the following terms: "In arriving at a conclusion, it would be unwise to neglect a class of objections which, if they be not founded on any very solid or satisfactory grounds, might, nevertheless, be very prejudicial to a town like Torquay, and which I will term the prejudices of the public on these subjects. For such reasons, were there no better, I should advise you not to depend on your present outfalls (or any enlargement of them) which deliver the sewage into the shallow parts of the bay. Assuming even that the sewage delivered by your present outfalls, mixed as that sewage is with a considerable volume of water, cannot be afterwards productive of ill-health to the inhabitants, still its very appearance in the places where yachting people resort, and where persons in boats are moving about, cannot but inspire feelings of disgust, which you cannot neglect, though some may consider them to be more akin to sentiment than reason. But, apart from what some may term mere prejudice, you cannot at your present outfalls, even with a considerable expenditure of money, provide reservoir space enough to admit of a continuous flow of sewage, which, as far as possible, should be done if the gases are to be prevented from being forced back into the sewers or from escaping at the margin of your principal promenades. On a review of the whole question, I have arrived at the conclusion that Mr. Bazalgette's last proposal—viz., to construct an intercepting sewer to carry the sewage to deep water at Hope's Nose—is the best plan to adopt. The prevalent winds in this country are westerly, and on that account it is right to place the sewage outfall to the eastward. Moreover, by constructing the intercepting sewer suggested by Mr. Bazalgette, a drainage outlet would be afforded for a sewer down the Isham Valley for the whole of the building land in and about that valley. I have not the means of making an accurate estimate of the cost of such a sewer, as that would depend on how much of it would be in shale and how much in rock, but I do not think that the cost need exceed £35,000." After some discussion, the following resolution, with only two dissentients, was adopted—"That the clerk be directed to inform the Local Government Board that this board is of opinion that the proper mode to be adopted with regard to the disposal of the sewage of Torquay is the one recommended by Mr. Bazalgette, and endorsed by Mr. Hawkshaw, and that the Local Government Board be requested to sanction the expenditure of a sum not exceeding £35,000." Instructions were then given to make the necessary arrangements for the preliminary inquiry by a commissioner, under the provisions of the Local Government Act.

Register of New Patents.

2670.—GEORGE EDWARD SMITH, of New York city, state of New York, U.S.A., for "*Improvements in self-closing gas-burners.*" Provisional protection only obtained. Dated Oct. 9, 1871.

This invention relates to a device for automatically shutting an extra gas cock affixed to a gas burner when the gas is extinguished without closing the main gas-cock, and consists in a hoop composed of a rim of steel and a rim of brass fixed to the burner, and operated by the unequal expansion and contraction of the metals to open and close the said stop-cock.

2714.—LOUIS STERNE, of 9, Victoria Chambers, in the city of Westminster, engineer, for "*Improvements in meters for water, gas, and other fluids.*" A communication. Patent dated Oct. 13, 1871.

This invention has special reference to meters known as diaphragm meters, and it consists in certain improved constructions, combinations, and arrangements of parts of single-acting and double-acting meters on this principle—viz., The combination of a flexible diaphragm with an oscillating arm or frame

fitted within it, and carried by a rock shaft, to which is rigidly connected a rigid arm provided with an arched and flanged crosshead, and with a spring, so as to act, through the intermediation of a lever, upon the valve of the cock, which admits the fluid to the body of the meter, at the two sides of the diaphragm alternately. The employment of a ring to make the meter fluid tight, this ring surrounding the upper part of the oscillating arm, and being clamped between the two halves of the meter. Making the diaphragm of an elastic metallic frame enclosed by india-rubber. An arrangement or device for dispensing with stuffing-boxes in meters, preventing leakage, and reducing friction. An arrangement consisting of a continuous wire and certain projections for preventing the meter indices from turning, and also for producing the necessary friction between the registering wheels and their hubs. A device for adjusting the measurement. A peculiar mode of attaching the plate of the register, for the purpose of avoiding any lateral strain on the rock-shaft bearings in working the register. An improved mechanical movement or arrangement for working the valve of the meter. In double-acting meters, the combination of two flexible diaphragms with a rotary valve, and the combination of certain slotted arms connected with the two chambers, and of a crank-pin connected with the valve. In double-acting gas-meters, the arranging of the two chambers at such an angle to each other that the two sides of the casing tangenting, the outer curves of the chambers between their centres and rear edges may meet at a right angle to obtain sufficient space for the play of a crank of such length as to secure an easy movement of the valve, while maintaining the meter within a small and convenient compass, giving to it a prismatic form adapted to fit in an angle or corner of a room. Certain arrangements of rock shafts, slotted arms, double levers, crank-pins, pauls, wheels, and other parts for enabling the meters to act more efficiently. And the adaptation of some of these improved parts and arrangements to double-acting piston meters.

2734.—JOHN ROWCROFT MACFARLANE, of the city of Manchester, in the co. of Lancashire, gas engineer, for "*Improvements in apparatus for charging and drawing gas-retorts, and for other purposes.*" Patent dated Oct. 14, 1871.

These improvements consist in employing a frame running on wheels, capable of traversing the length of the retort-house; scoops (filled with coal or cannel) are attached to slides fixed to a moveable head-stock, attached to the framework in such a manner that they may be moved out of the straight line to accommodate themselves to the positions of the retorts. The machine being brought opposite the openings to the retorts, the scoops are traversed by screws and nuts into the retorts, and when in a proper position, a catch on each scoop comes in contact with a fixed rod attached to the framework, and causes the bottom of the scoop, which is hinged, to open and drop its contents into the retort, the same catches and rods again closing the bottoms of the scoops as they are withdrawn. For withdrawing the coke after distillation, a plate of iron nearly the width of the retort is hinged to the back end of each scoop in such a position that when entering the retort it shall be in a horizontal position, or nearly so, but when acted upon by a lever or handle worked from the outside of the machine, it shall descend, and, on withdrawing the scoop, scrape the coke out of the retort.

2755.—ALEXANDER MANN, of 107, Holley Street, Dalston, in the co. of Middlesex, for "*Improvements in taps or valves.*" Patent dated Oct. 17, 1871.

This is an invention of a tap or valve applicable for delivering regulated quantities of water to wash basins, lavatories, &c., where it is required to pass or draw off regulated quantities of water. The tap or valve is carried by a stem, with which is combined a spring acting to draw the valve up to its seat, and with which is also combined a controlling apparatus to govern the speed at which the valve is allowed to close after being opened.

2763.—WILLIAM CROOKES, of the City of London, scientific chemist, for "*An improved disinfectant and deodorizer.*" Patent dated Oct. 18, 1871.

This invention consists in mixing together or passing sulphurous acid into carbolic acid to produce a compound or compounds possessing disinfecting, deodorizing, and antiseptic properties. Another part consists in the use of creosylic acid or other similar homologue of carbolic acid, or the liquid commercially known as creosote, or any mixtures of the above in lieu of carbolic acid.

2767.—JACOB HOLDSWORTH, of Bradford, in the co. of York, manufacturer, for "*An improved feed or supply-pipe for supplying illuminating gas to gas-burners.*" Patent dated Oct. 18, 1871.

In this invention an internal tube is used, inserted, and secured telescopically within the supply-pipe at a point near the stop-cock. The hole or bore of the internal tube is of very small diameter, so as to prevent excess of gas reaching the burner.

2778.—WILLIAM HENRY TAYLER, of Tudor House, Anerley, in the co. of Surrey, doctor of medicine, for "*Improvements in stoves for burning gas or gas and air for general heating and cooking purposes.*" (Complete specification.) Patent dated Oct. 18, 1871.

This invention consists of a combination of chambers placed vertically one over the other, leaving an annular space communicating with the external atmosphere between each chamber, by means of which free ventilation is afforded, and the odours and impurities usually given off by gas-stoves entirely removed and destroyed. In addition, the stove is so constructed as to cause the heated air to pass out through a trough containing a substance which acts as a decomposer or filterer, and removes any further impurities, so that the hot air, when mixing with the external atmosphere, is rendered pure and wholesome.

2795.—EDWARD DUFFEE, of Haverhill, in the state of Massachusetts, U.S.A., for "*Certain new and useful improvements in screens for coal-gas purifiers.*" (Complete specification.) Patent dated Oct. 19, 1871.

The object of this invention is to provide a cheap and durable screen for dry coal-gas purifiers, one which shall be capable of better withstanding the corrosive action of the lime and the impurities with which gas is charged than those formed of wire netting as heretofore employed, and consists in forming the screens of thin strips of wood crossing each other, and either notched together or interlaced in the form of basket-work, and supported by a suitable framework. Also in so forming the frames of the screens as to prevent abrasion and injury of the interlacing strips; that is to say, making a groove in each outer vertical face of the frame, so that the looped ends of the interlacing strips shall be imbedded or sunk below such face, or forming the side bars of the frame with projecting tenons or abutments, and the end bars with extensions or their equivalents, of such length as to protect the said looped ends from injury and wear when the screens are arranged in the purifying boxes, and so as to abut against each other, or while being "dumped" of the lime after it has become impregnated with the impurities eliminated from the gas.

2815.—EDWARD THOMAS HUGHES, of the firm of Hughes and Son, 123, Chancery Lane, London, patent agents, for "*An improved liquid-meter.*" A communication. Patent dated Oct. 21, 1871.

This invention relates to an oscillating device for measuring the flow of liquids, and consists of a cylinder or tube suspended upon two points or bearings, one on each side, at or near the middle, and having a valve to control the flow of the liquid into and out of the cylinder or tube, which valve has two vertical working faces which bear against each other, one of the said faces having two ports therein communicating with the interior of the cylinder at each end, each of which ports is put in alternate communication with the inlet and outlet ports in the other working face of the valve each time that the cylinder oscillates.

2832.—PETER SPENCE, of Newton Heath, Manchester, in the co. of Lancaster, manufacturing chemist, for "*Improvements in the treatment of oxide of iron which has been used in the purification of illuminating gas, for the purpose of again making it available for that process, and also for the manufacture of sulphate and muriate of iron.*" Patent dated Oct. 25, 1871.

In the purification of illuminating gas it is well known that oxide of iron is used for the abstraction of sulphur, the said oxide being sometimes supplied in that condition and sometimes in the combined condition of the sulphate, or as it has been proposed in the muriate. It is also known that after this oxide has been used a certain number of times in the purifier that it is not commercially available for further purifying purposes, on account of its having become impregnated with a large amount of sulphur, and that it is then burnt for the manufacture of sulphuric acid; and it is to the residue of this burning that this invention refers, the object being to make it again available for the purifying process or for the production of sulphate or muriate of iron. To effect this the said residue is mixed with sawdust or other carbonaceous matter in proportions that are not material; but as a general observation it may be stated that 10 per cent. of the said carbonaceous matter will be sufficient. This mixture is placed in any ordinary suitable furnace which will bring it to a red heat, and while it is in that condition it is drawn out into a vessel capable of being closed as those are which are employed in the manufacture of charcoal, so as to prevent the admission of air. During this drawing out the vessel cannot, of course, be closed; but as the mass of material continues in a burning state for some time, the air which enters during the time the operation is going on is not of any moment. The vessel is now closed and the material allowed to cool, after which it is not only found that the iron is in a state of protoxide and again suitable for the purification of gas in the ordinary manner, but also that the material has been rendered soluble in sulphuric and hydrochloric acids, and therefore available for the manufacture of copperas or muriate of iron as described in the specification of a patent dated Sept. 26, 1868, No. 2959.

2844.—WILLIAM THOMAS SUGG, of Vincent Works, Vincent Street, in the city of Westminster, for "*Improvements in apparatus for distributing fluids and liquids.*" Patent dated Oct. 24, 1871.

This invention relates to the construction of moveable joints to pipes used to convey gas or other fluids, and consists in connecting to the main supply-pipe a curved pipe with its open end upwards. This open end is formed with an annular recess which is partially filled with mercury, and receives the lower part of another curved pipe which is supported by a spindle working through a collar in an arm attached to the lower pipe, and in a step also attached to the interior of the lower pipe. The top pipe is thus free to move in any direction, although perfectly gas-tight.

APPLICATIONS FOR LETTERS PATENT.

2800.—JOHN THOMAS BROWN PORTER, of the city of Lincoln, civil engineer, for "*Improvements in combined gas apparatus to be used on board ship.*" Sept. 21, 1872.

2814.—ROBERT KING, of Wolverton, in the co. of Bucks, engineer, for "*An proved gas-regulator.*" Sept. 24, 1872.

2841.—WILLIAM THOMAS SUGG, of Vincent Works, Vincent Street, in the city of Westminster, for "*Improvements in apparatus for regulating the supply of gas.*" Sept. 26, 1872.

2847.—CHARLES WEIGHTMAN HARRISON and ALFRED HORATIO HARRISON, both of High Holborn, in the co. of Middlesex, gentlemen, for "*Improvements in combining atmospheric air and certain gases for lighting and heating purposes.*" Sept. 26, 1872.

2855.—JAMES M'KELVIE, of Edinburgh, in the co. of Mid Lothian, N.B., coal-master, for "*Improvements in the manufacture of illuminating gas.*" Sept. 27, 1872.

2874.—SAMUEL SWAIN, of Bradford, in the co. of York, mechanical engineer, for "*Improvements in gas-fittings.*" Sept. 30, 1872.

GRANTS OF PROVISIONAL PROTECTION.

2576.—GEORGE SPENCER, of 77, Cannon Street, London, civil engineer, for "*Improvements in the purification of coal gas used for illuminating purposes, and for mechanical purposes, and in apparatus therefor.*" A communication. Aug. 30, 1872.

2592.—WILLIAM HENRY SAMUEL, of the firm of Samuel and Peace, of Liverpool, in the co. of Lancaster, merchant, for "*Improvements in apparatus for lighting gas by electricity.*" A communication. Aug. 31, 1872.

2599.—JOB EDWARDS, of Wednesbury, in the co. of Stafford, manufacturer, for "*Improvements in the manufacture of fittings or junction-pieces for gas, steam, and water pipes.*" Sept. 2, 1872.

2602.—SAMUEL JOSEPH WOODHOUSE, of Holbeck, Leeds, in the co. of York, gas engineer, for "*An improved apparatus for purifying and regulating the supply of gas to burners; also an improved construction of burner and standard-tap to be used therewith, and for other purposes.*" Sept. 2, 1872.

2779.—ALEXANDER COLVIN FRASER, of 41, Clarence Road, Finsbury Park, London, civil engineer, for "*Improvements applicable to retorts for the manufacture of gas.*" Sept. 19, 1872.

2800.—JOHN THOMAS BROWN PORTER, of the city of Lincoln, civil engineer, for "*Improvements in combined gas apparatus to be used on board ship.*" Sept. 21, 1872.

NOTICES TO PROCEED.

1457.—WILLIAM MORRIS, of the Kent Water-Works, Deptford, in the co. of Kent, engineer, for "*An improved mode or method of and means for establishing a communication with water or gas mains.*" May 14, 1872.

1461.—WALTER GEORGE FEARNLEY, of 2, Eardley Crescent, West Brompton, in the co. of Middlesex, manufacturer of gas apparatus, for "*Improvements in apparatus for making illuminating gas, heating apartments or chambers, and other purposes.*" May 14, 1872.

1545.—THOMAS GOODE MESSENGER, of Loughborough, in the co. of Leicester, hydraulic engineer, valve manufacturer, and horticultural builder, for "*Improvements in the coupling of pipes and in the fittings thereof, and in valves to use in connexion therewith, and for other similar purposes.*" May 21, 1872.

2292.—ALFRED TYLOR, of 2, Newgate Street, in the City of London, brass-founder, for "*Improvements in apparatus and arrangements for the water supply of water-closets and baths, and preventing waste, applicable also in whole or in part for controlling, regulating, and arresting the flow of liquids and fluids, and preventing waste.*" July 31, 1872.

2362.—SAUL MYERS, of Vale Terrace, Sutherland Gardens, Maida Vale, London, in the co. of Middlesex, for "*Improvements in gas-lighting apparatus.*" A communication. Aug. 8, 1872.

2372.—FRANCIS GOOLD MORONY STONEY, of Glasgow, in the co. of Lanark, N.B., civil engineer, for "*Improvements in stop-valves or sluices.*" Aug. 9, 1872.

2416.—SAMUEL CHANDLER, sen., SAMUEL CHANDLER, jun., and JOSIAH CHANDLER, of London Road, Southwark, in the co. of Surrey, gas engineers, for "*Improvements in dip-pipes for regulating the seal in hydraulic mains used in the manufacture of gas.*" Aug. 14, 1872.

2542.—WILLIAM WILLIAMS BOX, of Crayford Gas-Works, in the co. of Kent, for "*Improvements in apparatus used in the manufacture of gas.*" Aug. 27, 1872.

2599.—JOB EDWARDS, of Wednesbury, in the co. of Stafford, manufacturer, for "*Improvements in the manufacture of wrought-iron fittings or junction pieces for gas, steam, and water pipes.*" Sept. 2, 1872.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2233.—THOMAS BARNES, "*Improvements in the treatment of coal for the removal of the sulphur compounds contained therein.*" July 22, 1869.
2264.—BRISTOW HUNT, "*Improvements in valves.*" July 26, 1869.
2276.—THOMAS PARSONS, "*A new and useful mechanism, apparatus, or engine to be used either in measuring water discharged from a conduit, or for various useful purposes.*" July 27, 1869.
2319.—JAMES PINCHBECK, "*Improvements in gas-meters.*" Aug. 3, 1869.
2346.—BENJAMIN JOSEPH BARNARD MILLS, "*Improvements in meters for measuring liquids and gases.*" Aug. 5, 1869.
2354.—WILLIAM ROBERT LAKE, "*Improvements in devices for holding the chimneys of gas-burners and other lighting apparatus.*" Aug. 6, 1869.
2395.—SAMUEL JOSEPH WOODHOUSE, "*Improved apparatus for purifying and regulating the supply of gas to burners, and also for an improved standard tap.*" Aug. 10, 1869.
2416.—WILLIAM ROBERT LAKE, "*Improvements in machinery for charging gas-retorts.*" Aug. 12, 1869.
2509.—WILLIAM ROBERT LAKE, "*Improvements in posts or standards for gas-lamps.*" Aug. 23, 1869.
2534.—HENRY PALFREY STEPHENSON, EUGENE GEORGE BARTHOLOMEW, and ROBERT KING, "*Improvements in lighting and extinguishing gas-lamps.*" Aug. 26, 1869.
2561.—JOHN LOADER, "*Improvements in rotary engines and pumps.*" Aug. 28, 1869.
2739.—HENRY COCKEY and FRANCIS CHRISTOPHER COCKEY, "*Improvements in apparatus for scurfing retorts.*" Sept. 21, 1869.
2805.—ROBERT HARLOW, "*Improvements in valves or cocks.*" Sept. 27, 1869.

PATENT WHICH HAS BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2215.—GEORGE ROBINSON, "*Improvements in moulds for casting metallic pipes, retorts, and other articles.*" Aug. 29, 1865.

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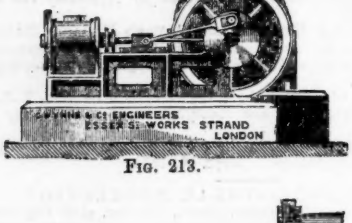

FIG. 213.

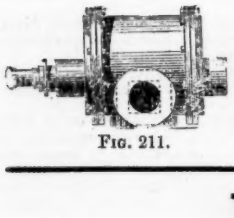

FIG. 211.

FIG. 219.

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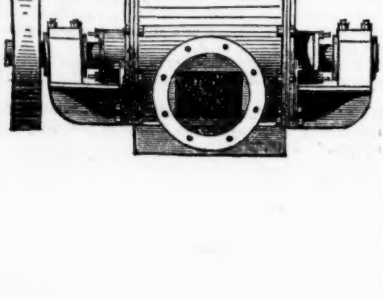

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TO CORRESPONDENTS.

DR. GERLACH.—*Received with thanks. A translation in progress.*
BARKER.—*The information offered will be thankfully received.*

THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, OCTOBER 22, 1872.

Notes upon Passing Events.

THE mania for asphalte seems subsiding to rational proportions. That it has great merits no impartial inquirer can deny. It is comparatively silent, free from dust, soon dry after rain, impervious to water, easily cleaned by either sweeping or washing; on the other hand, it is most dangerous if not kept strictly clean by the boy-orderly system, totally unfit for steep gradients, and found dangerous for horses employed in drawing heavy loads on a dead level, even in the best state of the weather, for the horses have no foothold to make the first start with a ponderous waggon or heavily-loaded van. On the last point the drivers of the railway vans proceeding to Broad Street are unanimous. Once started, the vehicle rolls smoothly along with little friction; but to stop and start again is the job!

Sed revocare gradum hic labor hoc opus.

At the Holborn Board of Works grave doubts have been expressed whether asphalte was the thing for the heavy traffic of that district. The question of expense is also serious where there is not a wealthy constituency like the shopkeepers of Cheapside to be considered. The engineer of the City stated that the expense of paving narrow City streets was just five times the expense of asphalte—about £50 to £250; and the cost of maintenance about the same. This dismisses from further consideration the dream of the newspaper engineers, who proposed to substitute universal asphalte for tramways. The asphalte on the brain that seems to madden certain vestrymen, reminds one of the wild days when at one time hydropathy, and at another Turkish baths were not only to cure all diseases, but restore youth and strength to old men, and bloom and beauty to faded virgins. Wood pavements on new systems that afford a secure foothold to horses, are coming into favour since the experiment in Bartholomew Lane. Wood does not dry so quickly, or clean so easily as asphalte, but it is silent under traffic, and can be employed on inclines where heavy vehicles must use a drag. Tramways continue of extend their lines, and to find plenty of traffic, partly taken from the omnibus trade, and partly created by "a ride for twopence," with no cranky steps to ascend, no door to bang, plenty of light, air, and room. The Local Boards of Works, also, favour a system which pays two-thirds of the road rates. Altogether, tramways are likely to have the suffrages of the million. To the owners of light carriages they are an unmitigated nuisance. They substitute granite for macadam just when the steam roller had made macadamized roads perfection. They make traps for horses feet, and provide grooves, especially at the points and sidings, which are apt, in spite of the greatest care on the part of the coachmen, to wrench the wheels and twist the axles of the light carriages which are so much in use. But, as in the case of the railway and the stage coach, the few will have to submit to the many; the tramway will very soon conquer its way through every thoroughfare not too crowded. In the meantime an extension from Finsbury Square to the end of Moorgate Street is urgently required.

We are to hear very soon on what terms the French Commercial Treaty is to be renewed. It is to be hoped that if restrictions on the trade in coal—to which we submitted in the Emperor and Mr. Cobden's negotiation—are not removed, no restriction on wine duties will be permitted. Our only chance of increasing our trade with those two rich, undeveloped countries, Spain and Portugal, is to take an article of export produced in almost unlimited quantities, in which the mass of the population are interested—wine. A reduction of the duties on Spanish and Portuguese wines to the same amount levied on Bordeaux and Burgundy, is the only weapon a Spanish finance minister can use to break down the opposition—the compact army of Protectionist manufacturers. There is another point of importance. Although amongst the middle classes claret wines have made considerable way, amongst the working classes they are almost unknown, and likely to continue so. All northern nations like something strong, except where they take to water pure and simple. Cheap port and sherry would wean a good many from spirit-drinking. Of course, the Customs Board and Board of Inland Revenue will object to any lowering of the alcoholic test and alteration in the mysteries of bonded goods. But when were not these Boards, like the Board of Works, the Board of Woods and Forests, and every other set of officials "moving in a mechanical groove," opposed to every change?

The orators at public meetings continue to explain to Hodge how much he will suffer from the effect of high wages. It is astounding that men of ordinary sense should venture to talk

such stuff. Of course, if wages are forced up by temporary and local causes, assisted by a strike, they will fall to the level of the demand in due time; but if the demand for higher wages in a low-waged county is accompanied by the migration of the surplus hands, who only find full employment in harvest, the residuum must be fewer and better paid. But, in the meantime, why is Hodge expected to be so unlike other British human beings? *Nolo episcopari* is sometimes uttered in earnest, but it is usually in reference to some ill-paid, unhealthy colonial bishopric, where, as Sydney Smith said, "cold parson is always on the savage sideboard." To refuse "the bird in hand," the present half-crown a week, in favour of the bird in the bush of some charities reserved for good-boy labourers, is a sort of virtue only found in tracts where "the "man models the lion." The rurals read newspapers; they have letters from their daughters in service as housemaids and cooks; and learn that wages are fixed in towns without reference to perquisites or presents.

Ignorant impatience of taxation has been making itself felt in the vestries of the metropolis in reference to the expenditure of the School Board. The School Board had and has to provide for uneducated children in a population of three millions. Nothing could be done in this great task until correct information had been obtained. Then followed, beside the innumerable difficulties of detail, the opposition of two classes—those who object to pay anything for education, which they consider either needless or a sort of rivalry to their own uneducated or half-educated children. St. Pancras represents this section of little keen tradesmen perfectly. A sharp man, with a properly adjusted pair of scales, and a genius for mixing tea and sugar, requires very little arithmetic to make money in a poor neighbourhood. Why should any one be taught more than he knows? And next, those zealous religionists, who would sooner that thousands grew up without knowing anything of right and wrong, or hearing of the Creator and the Saviour except in the way of blasphemy, unless God and Christ are framed and draped in Ritualistic, Wesleyan, Baptist, Calvinistic, or some other sectarian furniture and effects. "Perish the country," said the atheistic Abbé Sieyes, "but the constitu- "tion I framed must live." Fortunately, in this public-speaking, printing, and publishing country, many questions are rationally settled after discussion, which would puzzle the most intelligent despot ever imagined by Mr. Carlyle. Although the vestries howl against the School Board, the progress of education is not less certain. A place will be found for the decent and for the ragged poor.

A very pretty quarrel is going on in the newspapers, which cannot but do good. What is to become of the gutter children—the happy imps of dirt—who used to be collected into ragged schools, now often discontinued under the weight of school rates? A lot of thirty, sent into a rate-aided school, were summarily expelled. They were noisy; they were—excuse the word—lousy. Their language was foul, and so were their clothes. The parson who sanctioned this wholesale expulsion was at once taken to task by Lord Shaftesbury, who spoke for his eminently sympathetic audience, the ragged-school boys. Both parties were right. The gutter children must be gathered up, set to work, and taught, but under such conditions as will not destroy a school where boys, however poor, are moderately clean and eminently decent. The discussion has brought out a practical suggestion for night-schools, to which the little boys and girls engaged in working for their living, as flower, newspaper, or match sellers, may—or rather must—resort at night. The difficulty of settling where school fees are to be remitted, and where not, is great, because each case depends on its own merits. Here it is a widow with a bare existence, there a workman out of work. But the agitation and discussion in the papers will prepare Parliament for the needful amendments and additions to the Education Act.

The vestries of the metropolis generally are in a state of ebullition. St. George's has a little quarrel with Mr. Stansfeld and the Local Board on the subject of fees paid to medical men on the examination of lunatics. Bethnal Green has lately been as much robbed in its stores as the old Board of Admiralty which Sir James Elphinstone admired. Marylebone is about to make war on the costermongers stalls, and has given them all four months notice. Another union has given the same class only four weeks. Clerkenwell declines to appoint an analyst to examine into the genuineness of the groceries of that democratic district; in Lambeth an analyst has been appointed. In Bermondsey it is the dear bakers who desire to have the loaves of their cheaper rivals analyzed. In the meantime the Registrar-General tells us that the year has been unusually healthy.

Shall pauper children be barracked or boarded out? That is a question hotly debated as the old cause of quarrel—the gold or silver shield. All pauper children, orphaned or deserted, ought to work for their living. To earn an honest living is the first duty of man, and of woman, too; and also the most important part of education. The old apprenticeship system, under which Mother Brownrigg (not, strange to say, as yet rehabilitated by Miss Strickland or Mr. Froude), "whipped three female 'pren- "tices to death," was founded on this idea. The merit lies in choosing honest, hard-working homes, and in careful, frequent inspection. There is no doubt that a girl brought up in the household of a respectable woman, with children to nurse, meals to cook, and clothes to wash, is much more likely to turn out a useful member of society, supposing that she has received, and is receiving, a proper share of education, than one confined within the walls of a pauper convent, fed and clothed without anxiety, and rewarded more liberally for the stupid docility, obsequious hypocrisy, and parrot-like memory, than is often found in an independent, energetic spirit. Convents and barracks are not good for girls or boys, even if managed on the very best systems; but without infinite care and most judicious supervision the boarding-out system may be abominably abused.

When Baron Liebig is wrong—and that eminent chemist generally is wrong when he leaves the professional chair to meddle in any practical business—he always tries to cover his mistakes in a cloud of words. The general public are under the impression that Liebig's extract of meat contains the concentrated essence of all the nutriment to be found in beef; and some one—if not the Baron, his representatives—make a great deal of money out of this idea. At the Social Science Meeting at Brighton, Dr. Edward Smith reduced this very convenient form of making beef tea to its true value—viz., as an exciting restorative to prepare a stomach enfeebled by fasting or sickness for more solid and really nutritive food. The Baron replied in a very long and angry letter to this insult of one of the "vampire"-like race of Anglo-Saxons. The other day, on his return from his vacation, Dr. Smith returned to the attack of the meat sham, and showed, from Baron Liebig's own admissions, that extract of meat was food in the same way as tea or coffee, and not more—very useful, but not a maker of flesh or fat. If beef tea—Liebig's or any other—is to be used as food, it must be fortified with the yolks of one or two eggs, or, if the patient can digest it, with any farinaceous food. But its first use is as a drink—*calmant digestif*—like good Bordeaux wine.

A whole column of a daily contemporary is devoted to "good "news for the sea-sick," in the shape of promised grand improvements in the sea-passage across the Straits of Dover. Mr. Bessemer, associated with Mr. E. J. Reed, promises a pair of vessels, the plans of which are nearly ready for the builder. The specifications for the engines and boiler being completed:

These steamers are of larger dimensions than the famous Holyhead boats, but will only draw 7 feet of water, and will each be propelled by engines of 750-horse power nominal, equal to 4600 indicated horse power; and, consequently, with their small immersed area of midship section, be capable of running with ease at a speed of 20 miles per hour. They will be provided with a spacious saloon of 50 feet in length by 30 feet broad, and with a height of 20 feet, and be thoroughly well lighted and ventilated. At each end of the saloon there will be four private rooms for ladies, and the same number for gentlemen, the whole being surmounted by a promenade deck of 70 feet in length, at a height of 7 feet above the ordinary deck of the vessel. The whole of these rooms and the raised promenade deck will be so constructed that a "steersman" can, by means of a powerful hydraulic apparatus, govern and sustain the whole structure so completely and quietly that the passengers will not be subjected in the roughest weather to a greater amount of motion than is felt in an ordinary railway carriage. Each of the rooms and the promenade deck will be at all times accessible by a broad staircase free from motion and of most easy ascent, so that passengers may enjoy the fresh sea breeze on the quiet, level promenade deck, or, if the weather is unfavourable, descend to the saloon below. The arrangements for the transfer of luggage to and from the vessel are such as to prevent the possibility of injury to it in any way, while it will save much time in its transhipment; and, generally, I may state that the object kept steadily in view in the design and arrangement of these vessels is the greatest possible comfort and convenience of the passengers, the rapidity of transit, and, above all, the prevention of that dreaded malady sea-sickness, with all its attendant horrors.

Mr. E. A. Smith, of 150, Leadenhall Street, states that—

A few gentlemen have associated themselves together to make arrangements for the construction of a vessel on the plan advocated by Captain Dicey in a letter published in *The Times* of April 22 last. Trials have been made, showing that a vessel constructed on this plan will reduce to a minimum the inconvenience caused by the excessive motion now experienced in the present small vessels employed in this service. There will be almost entire freedom from rolling or pitching, the accommodation will be such as to afford every comfort and convenience for passengers in lofty and airy saloons, with ample room for promenade on the saloon deck, while the draught of water will admit of the vessel using the present harbours without the necessity of any alteration in the construction of the latter. As vessels on a somewhat similar plan to Captain Dicey's have long been in use in India, there cannot be any doubt of the success of the vessel now proposed to be built.

While another correspondent describes contemplated improvements of the landing at Boulogne, by an extension of the railway to the western quay; while—

As to the projected improvement of Boulogne Harbour, so as to admit steamers of the Holyhead type at all times of the tide, the plans, made out by able engineers, and approved by the French Government engineers, are completed, and it is certain that what is wanted could be accomplished at a cost not exceeding £320,000. It is also known that the French Government are willing to give a very favourable concession as to tonnage dues and future extensions to any company executing these works; and it is understood that the South-Eastern Company are prepared to give their assistance towards their being carried out, as also similar works at Calais.

He proceeds to appeal to England to find the needful capital. The writers who are so fond of the French system of official engineers and universal Government interference will have diffi-

culty in explaining how it is that the Imperial Government could never manage to do what two English railway companies do for themselves at Dover and at Folkestone. As long as our own Government had the sea transit across the Irish Channel in their hands, it was wretched. Private enterprise created the universally admired Holyhead steamboats.

The affairs of the Metropolitan Railway have been again brought before us in a telling and somewhat clap-trap speech by Sir Edward Watkin. There is no doubt that the hopes of the shareholders and the prices of the shares have been unduly raised by the sanguine speeches of an influential director. As Sir Edward Watkin by name accuses so many, he accuses those whom he does not name. Charles Lever's Irishwoman says to the corporal, "Either you or the colonel's a liar, and I am sure "it's not the colonel." The question really interesting to the shareholders is, "Did the sanguine speaker deceive himself, or did "he make money out of his fine speeches?" That question Sir Edward did not venture to answer. Yet it ought to be answered. As to the remarks on the carriages of successful contractors, and the diamonds of successful engineers wives those were all bunkum. A man who succeeds, spends his money how he likes. A great deal in the way of an equipage may be had for a thousand pounds—a small sum for such a man as Sir Edward Watkin to earn in a month—and diamonds are figures of speech. Sometimes they are hired; sometimes they are paste; sometimes they are emeralds, and not diamonds at all. The question is not how a man spends his money, but whether he earns it honestly. Every one admits that the late Mr. Brassey was a fair man. Yet he might have given his wife a complete *parure* of diamonds as rich as the Coutts'—Duchess of St. Albans—stomacher, necklace, ear-rings, bracelets, &c., &c.—and sent each of his three sons into the Park with three thousand pounds worth of carriage and horseflesh, without hurting his fortune or his customers. The fault in the Metropolitan management, irrespective of errors about dividends, was that all details were forgotten. There was a Micawber-like trust that something would turn up that would set everything right. As for the travelling public, they have only to congratulate themselves that the to be or not to be of the Underground circle did not rest with "my lords" of the Treasury, or a Chancellor of the Exchequer, or a committee of aged engineers, like those who pronounced rifled guns absurd, and the shell that General Boxer borrowed and christened, impossible. London has got the railways so far, and will soon have them joined in a complete circle. As far as the metropolis is concerned, the shareholders money is much better invested than in Erie Railway shares, or one of Baron Grant's Californian gold mines.

Circular to Gas Companies.

The agitation which has been going on for some time among the gas stokers in the metropolis culminated in a strike of the men employed at the Haggerstone station of the Imperial Company, on Saturday week. It proved to be of short duration, for the men returned to work on the following Monday, their places having been supplied with more or less efficiency in the interval. The immediate cause of the strike appears to have been some misunderstanding with the manager, and it was not dictated by the leaders in the movement. Amicable negotiations are now proceeding between the directors and delegates from the men, and we feel satisfied that the former will concede all that can be granted. While these negotiations are pending, and knowing from communications we receive that some, at all events, of the men are readers of the Journal of Gas Lighting, we put before them a few points for their serious consideration. In the first place we would remind them that "stoking" can hardly be called a "skilled" occupation. Undoubtedly men continually employed in the work accomplish it with a facility and quickness which raw hands could not exhibit; but a few days practice will make any ordinary man an efficient stoker, and unhappily there are always in this metropolis thousands of men without employment who would be only too glad to earn a stokers wages. With regard to one point said to be insisted upon—that the company shall only employ men belonging to the stokers union—we can scarcely believe the men to be serious in the demand. It is a point the companies could hardly concede, nor for the reason given above can it be necessary for them to grant it. It may be a question, too—but it is one for the men alone to consider—whether a general union would be beneficial to them as a whole class. Sick and provident funds they have already, to which the companies contribute; but they could not contribute to the funds of the union. Now stoking is a precarious employment. Of the whole number of stokers employed in the metropolitan works in winter, nearly one-half are inevitably thrown out of employment during several months of the year. This will involve heavy drafts on the funds of the union every summer, and will be a direct encouragement to the idle among them not to look for other occupation. It may be that this point has been well considered, and that one express object of the union is to afford assistance to men thrown out of employment in summer. If so, we have nothing to say against it. The chivalrous spirit which animates many trades-unionists, and makes them forego advantages they might gain for themselves individually for the sake of giving assistance or employment to additional hands, has never been appreciated as it should have been. But there is another point for the men to consider. Stokers, like puddlers, are being gradually dispensed with. The steam-stoker and machine puddling are taking their places, and strikes will greatly hasten the substitution. In all large gas-works now planned, arrangements are made for a steam-stoker, and probably the manager of every existing work is now considering how the machinery can be adapted to his circumstances. Wherever this machine is introduced it will supply the place of three-fifths of the men employed, and will save the company nearly 50 per cent. in the cost of labour. Let us take, as we happen to have them before us, the results at the works of the Dublin Company, who were driven to the adoption of the machine by the exorbitant demands of the stokers. There the machine, attended by 28 men, at a cost, so far as labour is concerned, of £39 per week, does the work which was formerly done by 48 stokers and 12 helpers, at a cost of £95 per week. Taking fuel and all other matters into consideration, the saving is nearly 50 per cent. And be it known that the work is better done than it ever was done by hand labour. Now the tendency of public opinion to-day is to drive the companies to concentrate their works, so paving the way for the introduction of steam-stoking, and probably in a very few years the stoker's occupation will be gone.

There is yet another point we will put, although it must be well known to the intelligent leaders of this movement. Gas companies are not in the position of coalowners—to whom a strike has lately proved a fortune—from whom the miner rightly exacts an extra sixpence for raising a ton of coal, and who straightway add from 6s. to 10s. a ton to the price of coal to the public. The price of gas is limited, and the profits of gas companies are restricted by special and general Acts of Parliament, and any reduction of profits which results from the action of the men is taken to a great extent from the pockets of people who are less able to bear the reduction than the men themselves. We are glad to learn that anything like a general strike has never been contemplated by the leaders in the union. Unionism has never been popular with the middle classes, and probably nothing (not excepting a bakers strike) would make it more unpopular than the temporary discomfort which would arise from a general strike of gas stokers. Gas companies are not popular, but on this matter they would have the hearty sympathy of all consumers. Supposing a strike to occur, a short notice would reduce the private consumption to small limits, and the public lights might easily be kept going. With these remarks we leave the matter, with the firm conviction that full justice will be done by the companies, and intelligent moderation will be exhibited by the men.

As we are further removed from quarter-day, fewer notices of a rise of price reach us; but the following may be mentioned as having been announced since our last:—At Alyth an advance of 10d. per 1000 has been made, and at East Cowes the price has been advanced to 7s. 6d.; at Kinross the price has been advanced 1s. 4d.; at Montrose, 1s. 3d.; at Navin, 1s. 3d.; at Newhaven, 10d.; at Reigate, 6d.; at Spalding, 10d.; at Sutton, 6d.; and at Teignmouth, 10d. At Glasgow, Greenock, Lincoln, Oldham, and Knaresborough — all the works, except those at Lincoln, being in the hands of public bodies—it has been decided not to raise the price for the present.

The announcement of a new Association of Gas Managers is made—the West of Scotland Association of Gas Managers. The object of the Association is to meet together quarterly for mutual instruction, and conjoined with it is a managers fund, the object of which is not made clear to us—it may be a provident fund, or a fund to supply the members with additional means of instruction. In any case, the Association has our hearty sympathy, and we shall be happy to receive the reports of its proceedings. Associations of the kind cannot be too numerous, and the frequent meetings of this society is a strong point in its favour. Frequent meetings may, perhaps, have more of business in them, and partake less of the character of "outings."

We do not attend Mr. Flintoff's meetings, nor does Mr. Dresser Rogers, and we regret having been misled by a report into a supposition that he did. Mr. Rogers's denial of his acquiescence in the proceedings of the London Gas Consumers Protection Society will be found in another column, and we need not say that any insinuation based on his supposed presence at the meeting, and countenance of the proceedings, is altogether unfounded and withdrawn.

We have so often referred to the Ryde arbitration case, that we

may be excused for making one, and, we hope, final reference. We are informed that a considerable number of the members of the Town Council intend to resign their seats unless the gas company will release the Corporation from their obligation to purchase. This is a cowardly and unwise resolution, which we are sure will in the end be strongly resented by the ratepayers. If the company will release the Corporation, all well and good, but if not, the wiser and more honest course would be for the objecting members to remain in the council, and assist in making the gas undertaking a profitable speculation—not so hopeless a business after all.

Let no one say that inventors are not sufficiently rewarded in this country, when an invention which, as exhibited, consists essentially in blowing a stream of air, by means of a pair of bellows, through a bottle of light petroleum spirit, is sold in the City of London for £100,000, cash down! Nor can it be said that speculation is dead, when a company, formed to work this wonderful combination of bellows and bottle, gets, it is said, three times the amount of capital they asked for subscribed in four days! Everybody knows that a stream of air blown through or over the surface of an easily vaporizable liquid takes up and carries along with it some of that liquid in the form of vapour, which may be conveyed to a burner, and consumed to afford light, according to the composition of the liquid and the proportion of vapour which reaches the burner. If the pipes are kept warm, and a good velocity is maintained, these vapours will undoubtedly travel a considerable distance, but how far has never been ascertained. Left at rest or with a slow current in the cold, the vapour will condense, and the oil or spirit, or "gazogen," will for the most part deposit as liquid in the pipes. This form of liquidation takes place without the interference of the Court of Chancery. For be it known, in spite of all assertions to the contrary, that nothing like a permanent incondensible gas is formed in any of these processes. The imaginative chemist, who discovers olefiant and marsh gases in these vapours, simply deceives himself, or wilfully seeks to deceive others. No such gases can be present. The analysis published of a mixture of one-third coal gas, and two-thirds of what is called air gas, carries absurdity and inaccuracy on the face of it, and will not for a moment deceive any one acquainted with the subject. For example, 33 parts of common coal gas are represented to contain 51 parts of marsh gas! What more need be said of such a report? And what can be said of the assertion that some gum or resin, dissolved in the spirit, is converted into vapour by a current of air, and gives richness to the gas? But it is useless to argue in cases like these. The public will be deceived, and the Air Gaslight Company must be left to follow the natural course of such schemes. One remark we must add. The Major-General Scott who stands as sponsor, promising and vowing all sorts of things in the name of the company, is not Major-General H. Y. D. Scott, of South Kensington, as asserted in some of the daily papers.

We must once again call the attention of our readers to the fact that the notices required to be given before Provisional Orders under the Gas and Water Works Facilities Act can be obtained must be published in the month of November. The advantages of obtaining these Orders are so obvious that nothing need be said to urge non-statutory companies to apply for them.

Correspondence.

THE CANTERBURY WATER-WORKS.

SIR,—On a recent visit to Canterbury, I was struck with the neat appearance of buildings on the outskirts of the city, which—evidently not for manufacturing purposes—puzzled me, looking only from without. On inquiry, I found them to be the water-works, the details of which so interested me that I noted them at the time. The general impression was so favourable, and the process on a large scale so satisfactory, that I do not hesitate to send the JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c., a short account of what I saw and heard.

On the formation of the company an artesian well was bored in the bottom of the valley to the depth of 500 feet. The boring-rods were driven by steam power, and nearly a year was thus occupied. The water now rises to within 20 feet of the ground surface, and the supply seems inexhaustible, as, however continuous is the pumping during the day, by the morning the water in the well has attained its original height. The pumps are plunger pumps, which send the water, when purified for use, to a reservoir in the highest point near the city 180 feet above the water level of the well. This main delivers water into the supply-pipes on the way, so that only the water unused in the city finds its way to the reservoir, which, however, is always kept full, and the supply-pipes are kept at high pressure, except during the repair of any pipes.

The water on issuing from the well is pumped into a large tank, where it is carefully mingled with cream of lime according to Dr. Clark's process. It is then allowed to settle and to become clear, which occupies nearly 24 hours. The water in the tank has that deep blue colour which is recognized as the blue of deep clear seas; this arises from some peculiar power of refraction, the water itself being as clear and brilliant as is possible.

There are three tanks—one full, one filling, one empty. When the water is clear, it is pumped into the reservoir above spoken of. The effect of the intermixture of lime is complete in reducing the hardness of the water; before admixture it is 16 degrees, when sent out for use it is 3 degrees of hardness, being, in fact, soft as rain water, and it scarcely decomposes the nitrate of silver. An impalpable powder of carbonate of lime is left in the tanks after the water has been decanted; for this the manager would be glad to find a market, it being a natural precipitate.

The amount of lime required is but small, 12 tons, made into cream, lasting three months. Of course, the varying proportions of mixture, and other details, are only to be learnt by practical experience—rule of thumb, as it is called.

The careful foresight for all emergencies and for future extension of the works reflect the highest credit on the engineer, though some of the details might have been carried out at a less expense. The daily working is under the intelligent care of Mr. May, who also manages the gas-works. A visit to the water-works will, I think, repay the visitor the trouble.

JOHN S. BARTRUM.

Bath.

VENTILATION OF BED-ROOMS.

SIR,—In the *Scientific Press*, a writer on the ventilation of bed-rooms says: "The deadly carbonic acid gas which comes from the lungs of every out-breathing of the sleeper rises to the ceiling in warm weather, but falls to the floor when the room is freezing cold; hence in summer the purest and coolest air in a room is near the floor, in the winter the foulest air is near the floor." Professor Wurtz, the editor of the *American Gaslight Journal*, demurs to this, and considers it incredible that in winter the carbonic acid gas from the expired breath falls to the floor.

The professors may disagree on this point, but we know that cold rooms are unhealthy in winter, *from more causes than one*, and all would use fires if it were not for the expense. A small gas-stove in a sleeping-room will, at a trifling expense, keep the temperature a few degrees above freezing, making the room comfortable and healthy.

Lower Sydenham, S.E. MAGNUS OHREN.

THE AIR GASLIGHT COMPANY, LIMITED.

SIR,—In the letter which I addressed to you and forwarded, unfortunately, too late for insertion in your last issue, I animadverted upon a scheme then in an embryo stage, and in a day or two it assumed the more developed and definite form of a "prospectus," of which the above is the heading, and the capital proposed to be raised in shares is £200,000.

The first public mention of the scheme was on the 4th instant, when the light was exhibited in Change Alley, Cornhill, after which, but on the same day, a *collation* was given at the Cannon Street Hotel, and a "report" was read by Major-General C. Scott, consulting engineer, who consented thus to give the assembled admirers of the new light an exhibition of his professional ability in the puffing line.

And on the 7th instant out came the prospectus full blown, headed by the announcement that "The subscription list will open on Tuesday, the 8th of October, and close on the following Saturday, at three o'clock."

And such is the amazing credulity of the investing public, that it is by no means improbable that, while I am writing, the capital asked for may have all been subscribed.

But the cool assurance of putting forth such a scheme in such a way is an astonishing sign of the times. *Two hundred thousand pounds* is asked for to carry out an *untried* scheme, and it is all to be subscribed in *four days!*

The scheme or invention being assumed to be beyond suspicion or question as to its answering when practically applied, it is not allowed to be discussed by those who know something of such matters, nor is it to be submitted to practical working on a moderate scale, as it easily might have been at a cost of a few hundred pounds.

I have looked through the list of directors, and do not recognize the name of a single one known to possess any special knowledge of the subject.

Nor has anybody the least reason to believe Major-General Scott to be qualified by practical experience to assume the prominent position assigned to him in the matter, and his "report" does not tend to dispel the suspicion that he has not fully mastered the subject which he has handled so boldly.

And as regards the "report" of the "late gas referee to the Board of Trade," it somewhat militates against his supposed competence to advise in such matters, when it is known that very recently the only one of the three "late gas referees" who had, previous to their appointment, any practical knowledge of the subject, has certified in plain terms to the ignorance and incompetence of the other two.

Whether such considerations as these will have been entertained by a discerning public, to whom this appeal for £200,000 has been made, will soon be known.

In the meantime I offer, for the consolation of coal gas shareholders, through your columns, the following observations upon the prospectus of "The Air Gaslight Company, Limited," in the order of the paragraphs as they are stated therein.

The company, we are told, is "established for the introduction to the public of a new illuminating gas."

This is not stating their case in correct terms; this so-called *gas* is not gas at all in the proper sense of the word; the means of lighting thus offered is the conveyance of light-giving matter to gas-burners by the employment of common air as a vehicle.

The cost of coal gas is next compared with the assumed cost of "air gas," although the actual cost of coal gas is not stated, and the public are shown that in the gross a saving of seven millions sterling per annum may be effected by the adoption of the one in the place of the other.

But many *little difficulties* will have to be overcome before a single coal gas-work can be jostled out of existence by the "Air Gaslight Company, Limited;" and until *all* the existing gas-works in the United Kingdom have been supplanted by the "air gas" supply, the *figurative* saving will not be effected.

Then we are informed that coal gas "is still, in many respects, injurious to health;" a strange statement, not founded on fact, and one which entirely fails to express what is intended. Its author, no doubt, meant to say the *use* of coal gas is injurious to health; and this would be true, if the gas were consumed in close or ill-ventilated apartments; but it is also equally true that it would be injurious to consume wax candles, giving the same amount of light under the same conditions; and the injury in the latter case would be greater than that in the former, the coal gas having been deprived of its impurities before leaving the gas-works, whereas the candles would give off theirs in the room while they were burning.

"Air gas," we are told, "on the contrary, is not only entirely free from sulphur and other chemical impurities, but, when mixed with coal gas, reduces its deleterious constituents and augments its illuminating power."

Now, this so-called "air gas" may be perfectly free from impurities, but it does not follow that *it*, any more than coal gas, can be burned in an ill-ventilated room without vitiating the atmosphere, and so being injurious to the health of the occupants. Every tyro in knowledge regarding such matters knows that there can be no combustion without oxygen, and in proportion as the oxygen in a room is consumed—say, by a gas-burner or an equivalent in candles—so is the air deteriorated.

Next we are told, "Coal gas requires, for its commercial production, expensive buildings, costly apparatus, and the maintenance of large stocks of coal, the prices of which are every day increasing."

And to this I reply that, notwithstanding what is required in the manufacture of coal gas, the fact is patent to all the world that at present it is the most convenient, reliable, and economical of all known means of artificial lighting.

And then follows the statement that "air gas does not require for its production the use of coal, nor the employment of furnaces, retorts, purifiers, or the expensive apparatus used in the generation of coal gas;" and yet it will be found that "air gas," as it is called, cannot compete with coal gas.

In support of this assertion, I may mention that I was employed, not long since, to examine and report upon an ingenious and patented method of producing a similar kind of so-called gas, and found that, although it had been examined by an eminent chemist, and was said by him to be "24-candle power," it was only 18·37, and when submitted to the test of cold at 40° Fahr. the illuminating power was reduced to 12·28 candles, and the cost per 1000 cubic feet was 2s. 11d. for the material only; whereas the cost of the manufacture of coal gas of the same, or about the same, average power would be about 1s. 9d. per 1000 feet, the difference in favour of the latter being 1s. 2d. per 1000 feet.

The only difference between the two "air gases," so far as I can learn from the prospectus of the Air Gas Company, is, that in the one now brought before the public some resin, or gum, is dissolved and held in solution in the distilled oil, by which the illuminating power is said to be increased; but in both cases the principle is the same—namely, *impregnating common air with hydrocarbons*—as stated in this prospectus in the following words:—

"Air-gas manufacture consists in charging a certain liquid compound, termed *gasogen*, with *atmospheric air*, or with atmospheric air and coal gas, thereby obtaining a richly-carbonized gas of the highest illuminating power."

It is set forth that "the apparatus employed is extremely simple, two vessels only being required—one the generator, the other the gasholder."

This, again, is misleading, because some apparatus or machinery *must* be employed to pass the atmospheric air through the so-called "*generator*," and before the "gasogen" can be employed in the "generator," it must be produced by the distillation of mineral oil; therefore, in comparing the two processes, common fairness would have dictated the admission that the process of distillation is the real basis of the two manufactures. In the one case coal is distilled, and in the other oil; and the difference in favour of coal-gas manufacture is that it is a *single* operation, the distillation of the oil resulting only in the production of a *spirit*, which has again to be dealt with separately. See the paragraph marked "C" in the company's Memorandum of Association, "To deal in and manufacture all such oils, chemical, and other materials as may be necessary to work the said patent invention."

And how is the coal gas for mixing to be obtained without the apparatus, which, in a previous paragraph, is described as *costly*, and the indispensable buildings as *expensive?* As it is put in the prospectus, it would seem that while expensive buildings are required for the commercial production of the one, none are required for the other.

But what about the *storeage* of such a compound as "gasogen," which should be called, in plain English, the spirit of mineral oil, with resin or gum held in solution, one of the most dangerous and highly inflammable liquids known, which, if employed as the sole article for lighting London, would involve a supply of about 2,500,000 gallons for only one month's consumption? and, to say nothing of the extent or expense of the buildings in which to store such a quantity, as the law stands it would not be permitted to store it either in the metropolis or anywhere near.

It is all very well for empirics to talk about the safety of the so-called gas, but the danger of storing and dealing with the spirit from which it is proposed to make it can scarcely be estimated.

And now, generally, without wading through the remaining paragraphs *seriatim*, for fear of tiring your readers, I would observe briefly that the objections to the process, and the host of similar processes, as a means of supplying towns and cities with artificial light, are many and serious.

The principle of using common air to convey the vapour of hydrocarbons to gas-burners is very old. The late Mr. George Lowe, whose fame as a gas engineer was world-wide, and who was a pioneer in the science of producing artificial light, applied it successfully and abandoned it.

After that the Photogenic Gas Company was established, and intended to revolutionize the science of gas lighting, but, after expending a considerable amount of capital, ended in utter failure.

The folly of the principle was also exhibited some years since in the City of London by some enthusiastic inventors, aided by a company, who obtained a contract for fitting an apparatus in each gas-lantern, whereby the gas, being brought into contact with hydrocarbons, was to be so greatly increased in illuminating power as to effect a very important saving in the cost of lighting the streets, by reason of about three feet of gas being made to give the light of five feet; but, unfortunately, it did not succeed, and the "generators" were in that case voted *de*generate, and removed under the Nuisances Removal Act, or some other summary process.

One reason for want of success in this direction being, that the sanguine ideas of the inventing geniuses as to the cost of the light thus obtained have been found to be erroneous, they first deceive themselves, and then, often unwittingly and innocently, deceive other people.

Another consists in the fact that the light is *extremely variable*, depending upon the temperature at which it is made, stored, and delivered; the vapours being given off by the liquids, and taken up by the atmospheric air or by coal gas, in greater quantity in warm than in cold weather, and so the light is rich or poor, and will always be poorest when a good light is most wanted—namely, in cold winter nights; and for all purposes and at all times, it must be obvious to the most obtuse intellect that *uniformity* of illuminating power is a vital element.

What may be done by the company in the way of "selling foreign patents" it is impossible to say, for it seems to be intended to cast a net which shall catch all the flat fish in the civilized world, nor what may be realized from "royalties at home and from licences abroad," but those who are interested as shareholders in the success of coal gas companies may rest assured that whatever else may happen, coal gas will not be superseded by common air impregnated with "gasogen."

I have said nothing about the chances of the "patent" proving hereafter to be *invalid*, which is a point open to grave doubts, seeing that it is only one of very many taken out to protect similar inventions, but as the specification is not yet enrolled or published, nothing can be said on the question; therefore, as to this consideration, the speculating investors will take a leap in the dark, literally without a gleam of light to shine upon the road which probably they expect will lead to fortune.

Nor have I said anything about the cost of an Act of Parliament, which must be obtained in each case before any town or city can be lighted by the company; or the inevitable necessity of buying up the existing coal gas interest in every town before the Air Gaslight Company can enter the field to save the country seven millions sterling per annum.

When these items are taken into account, it will become pretty clear that the business, instead of conferring, according to Major-General C. Scott, "an immense boon in all classes of society," will, like the Irishman's gun, cost more than it come to; but they appear to have been left out of consideration, and certainly are omitted from the "prospectus."

The whole thing, indeed, will, I believe, soon be proved to be a mare's nest, or the day-dream of a few enthusiasts, ending in a piece of *company-mongering*, less disastrous, but equally ridiculous as the old South Sea Bubble.

R. P. Spice.

21, *Parliament Street, Westminster, S.W., Oct.* 12, 1872.

A CORRECTION.

Sir,—In your "Circular to Gas Companies," in the last number of your publication, I notice that you state that I took the chair at a meeting, called by Mr. Flintoff, of the London Gas Consumers Association. I have so uniformly found your Journal reporting faithfully any part I may have taken upon the gas question in the metropolis, that I am surprised to see a statement so contrary to fact in a leading article. I beg to inform you that I was not present at the meeting held by Mr. Flintoff, and I also beg to state that I have never been present at any meeting held by that gentleman, nor have I ever belonged to a London Gas Consumers Protection Association. What I have done on this question has been from a sincere desire to improve the gas supply of London. I may have been sometimes mistaken in my course of action, but I have generally found the press ready to give me credit for disinterested feelings and sincerity of purpose, and should regret if even my opponents thought otherwise.

Your kindly inserting this contradiction, and noticing it in your "Circular to Gas Companies," will confer a favour.

E. Dresser Rogers.

Bridge House Chambers, 8, Borough, London Bridge, S.E., Oct. 17, 1872.

Miscellaneous News.

SURREY CONSUMERS GAS COMPANY.

The Half-Yearly General Meeting of Shareholders was held at the Terminus Hotel, London Bridge, on Monday, Oct. 7—THOMAS POCOCK, Esq., in the chair.

The SECRETARY (Mr. Boddy) read the advertisement convening the meeting and the minutes of the last meeting; the register of shareholders was sealed, and the following report and statements of account presented:—

The directors herewith submit the usual accounts and balance-sheets for the half year ending June 30, 1872.

The accounts show an available balance of £23,758 11s. 7d., which will admit of the payment of dividend, at the rate of 10 per cent. per annum, and leave a balance of £1539 8s. 1d. on the half year, which, added to the balance of the previous account, makes a total of £12,758 11s. 7d. to be carried over to the credit of the present half year.

The directors, anticipating the necessity of extending the manufacturing power of the works, have entered into a contract for the purchase of the freehold property, known as "The King's Mills," adjoining the company's premises at Rotherhithe, the possession of which will enable them, under any altered circumstances, to meet the requirements of the district.

Dr. — *Revenue Account, for the Half Year ended June 30, 1872.* — *Cr.*

To Manufacture of gas—				By Sale of gas—		
Coals, including dues, carriage, unloading, and all expenses of depositing same on works	£17,007 8 0			Common gas, at 4s. and 3s. 9d. per 1000 cubic feet	£31,098 11 7	
Purifying materials, oil, water, and sundries at works	351 14 6			Public lighting and contracts	6,411 7 8	
Salaries of engineer and officers at works	520 0 0					£37,509 19 3
Wages at works	3,462 12 5			Residual products—		
Repair and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour	3,683 9 3			Coke, less labour and cartage	7,150 17 10	
	£25,025 4 2			Breeze	43 12 8	
Less old materials sold	28 15 0			Tar	1,281 5 10	
		£24,996 9 2		Liquor	350 0 0	
Distribution of gas—						8,825 16 4
Salaries of inspector and clerks in Light Office	304 5 0			Rents		70 0 0
Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour	1,694 0 5			Transfer fees		3 12 6
Repairing, renewing, and refixing meters	321 6 2			Rental of meters		520 15 6
		2,319 11 7				
Public lamps—						
Lighting and repairing		643 1 6				
Rents, rates, and taxes—						
Rents	78 5 4					
Rates and taxes	1,676 15 10					
		1,755 1 2				
Management—						
Directors allowances	675 0 0					
Salaries of secretary, accountant, office-keepers, and messengers	497 9 0					
Collectors commission and salaries	361 11 2					
Stationery and printing	147 11 3					
General establishment charges	187 5 9					
Auditors	42 0 0					
		1,910 17 2				
Law charges—parliamentary		21 6 10				
Bad debts	250 18 7					
Discounts	146 10 4					
		397 8 11				
Depreciation fund		1,100 0 0				
Total expenditure		£33,143 16 4		Total receipts		£46,930 3 7
Balance carried to profit and loss account		13,786 7 3				
		£46,930 3 7				

Dr. — *Capital Account, for the Half Year ended June 30, 1872.* — *Cr.*

	Expenditure to Dec. 31, 1871.	Expended this Half Year.	Total to June 30, 1872.		Certified Receipts.	Received during Half Year.	Total Receipts to June 30, 1872.
To Expenditure	£266,888 16 0	£177 5 10	£267,066 1 10	By Ordinary shares of £10 each	£150,000 0 0	..	£150,000 0 0
				Ditto shares of £10 each, £7 paid	63,447 0 0	£6,537 0 0	69,984 0 0
				Mortgages and bonds	51,260 0 0	..	51,260 0 0
Total expenditure			£267,066 1 10				
Balance			4,177 18 2				
			£271,244 0 0				£271,244 0 0

Dr. — *Profit and Loss Account, for the Half Year ended June 30, 1872.* — *Cr.*

To Interest on mortgages and bonds, to June 30, 1872	£1,246 19 2	By Balance of net profit brought from last account	£21,719 3 6
Balance of net profit to be carried to next account, subject to half year's dividends, to June 30, 1872	23,758 11 7	Less dividend paid for the half year ended Dec. 31, 1871	10,500 0 0
			£11,219 3 6
		Balance brought from Revenue Account (No. 1), being profit for half year to June 30, 1872	13,786 7 1
	£25,005 10 9		£25,005 10 9

Dr. — *General Balance-Sheet, June 30, 1872.* — *Cr.*

To Profit and loss account—		By Cash at bankers	£12,868 9 6
Balance at credit thereof (Account No. 3)	£23,758 11 7	Coals, for stock on hand	105 0 0
Unpaid dividends	174 5 6	Gas-rental—	
Sundry tradesmen and others, for amount due for coals, stores, &c., to June 30, 1872	10,408 9 0	Balance of this account due to the company on June 30, 1872, less deposits and prepayments	14,542 4 9
Balance of capital account	4,177 18 2	Coke and other residuals	1,418 2 5
Depreciation fund	1,100 0 0	Sundry accounts	251 18 7
		Cash in office	433 9 0
		Ditto at bankers on deposit	10,000 0 0
	£39,619 4 8		£39,619 4 8

The CHAIRMAN, in moving the adoption of the report, said the state of his health would only allow him to offer a few remarks. He thought the shareholders would agree with him that the report and accounts were extremely favourable, and proved at once that the business of the company was progressing in a most satisfactory manner. Having made that observation, it would be very pleasant if he could leave off, and was not obliged to add anything which might alloy the gratification of the meeting. But it was necessary to refer to the circumstances surrounding not this company only but all gas companies. During the past six months the state of the markets for coal, iron, and labour had been a constant subject of anxiety, and though the directors had endeavoured to meet the difficulties as they arose, and to make the best of things, they were sometimes sorely perplexed how to act. The present price of iron and coal was a very serious matter, but the labour question was a more serious and perplexing one. He hoped that it might yet be settled upon an equitable basis. At the last half-yearly meeting the directors announced that they had reduced the price of gas to their consumers, and the result of that step up to the present time was satisfactory. They were very desirous to continue the supply at the reduced price, but looking to the state of the markets for material and labour, he confessed that he saw no prospect of being able to do so. The company could not work at a loss; still the directors would not resort to an advance in price unless they were absolutely compelled. Time only would prove whether they could do without it, and he hoped to see some change before the next meeting, which would prevent the necessity. With reference to the purchase of land mentioned in the report, he might state that the directors found they were beginning to get straitened for want of room on the works. They required space for additional retort power and for increased storeage, and he was happy to say that the premises for which they had negotiated, and of which they expected to come into possession, were freehold, as was all the other property of the company, except the site of the gasholder at Blackhorse Bridge. The directors felt that they had taken a prudent course in securing additional land for the purposes of the undertaking, and he believed the shareholders would concur in their judgment.

Mr. LIDDLE seconded the motion. He looked upon the present as one of the best reports that had ever been submitted by the directors, and he agreed in the remark of the chairman that in the midst of their difficulties the directors had indeed made the best of everything. As to the question of raising the price of gas, he would observe that "sufficient for the day is the evil thereof." It was a step which should only be resorted to when absolutely necessary, and when they would otherwise have to work at a loss. He congratulated the shareholders upon the purchase by the board of the property mentioned in the report, which he believed would prove highly advantageous in regard to future operations.

A SHAREHOLDER asked from what fund it was proposed to pay for the purchase of the King's Mills.

The CHAIRMAN: Out of capital.

Mr. BLAKE: What is the amount of the purchase-money?

The CHAIRMAN: £18,000. It is a fine property.

Mr. SMITH said he observed, from the report of the Chartered Company, that the returns for residual products showed the tar to be about one-sixth in value to the coke, and the ammoniacal liquor about one-third. In this company's accounts it appeared that the tar bore the same proportion in value to the coke, but the liquor was only 1-20th. He did not know whether the Chartered Company had resources for the disposal of their liquor which this company did not possess; if not, it was difficult to account for so large a difference in value.

Mr. FINLAY (the engineer) said he thought if the honourable proprietor who made the inquiry would examine the balance-sheets of the several London companies, he would find there was a considerable difference with respect to the value of tar and liquor. The Surrey Consumers Company had had a new contract for tar since May last, and had been doing well; but with respect to their ammoniacal liquor account, he confessed it was not what it ought to be, or anything like it. He accounted for it in this way—the company had not sufficient scrubbing power on the works, and to erect new scrubbers until they obtained possession of the adjoining premises would be useless. This portion of the com-

pany's plant required to be entirely re-arranged, and when the additional ground was obtained he proposed to remove one, if not the two scrubbers, and place them in a more advantageous position. To remove them previously would have been a waste of money. At present, in consequence of defective power in the apparatus, the liquor was very weak, and not worth what it should be; but, with regard to the return for tar, he thought this company would bear comparison with any other in the metropolis.

The motion was put, and carried unanimously.

The CHAIRMAN moved—"That a dividend of 5 per cent. for the half year ending the 30th of June last, free of income-tax, be declared, payable on and after Monday, Oct. 21."

The DEPUTY-CHAIRMAN (Mr. Duval) seconded the motion, which was put and carried.

Mr. BIDMEAD asked whether it could not be so arranged that the dividends would be payable at an earlier date.

Mr. NICHOLSON said the dividends were always payable one week after the half-yearly meeting, but through a misapprehension on this occasion the warrants had been printed for the 21st instead of the 14th. The present meeting was held, as future meetings would be held, four days earlier than hitherto, so that the delay was not very great.

The DEPUTY CHAIRMAN proposed a vote of thanks to the engineer and secretary, and said the company were under great obligations to those officers for the able manner in which they discharged the duties of their respective offices.

Mr. LAUGHTON seconded the motion, which was cordially adopted.

Mr. FINLAY said: Allow me to thank you very sincerely for the compliment you have paid me, and to assure you that I shall continue to exert myself to the utmost to maintain the prosperity of the company. The condition of things is now somewhat different to what it was some months ago. Gas companies have now many difficulties to encounter, but the greatest of all seems to me to be the wages question. I believe coal and iron will right themselves, but the labour question is very perplexing, because it is extremely difficult to reduce wages when once they have been raised. I trust, however, that we may meet again under circumstances as favourable as on the present occasion, and that you may not have a worse report than that now submitted. So long as I continue in your service, I shall devote my best energies to your interests.

The SECRETARY: Gentlemen, I am extremely obliged to you for the vote of confidence just passed. During the whole time I have been secretary of the company it has been my endeavour to promote your prosperity, and so long as I continue in that office I shall not fail in my exertions to secure that end.

On the motion of Mr. LIDDLE, seconded by Mr. PEMBROKE, a vote of thanks was given to the chairman and directors for their services.

The CHAIRMAN said the very handsome way in which the services of the board had been acknowledged called for his warmest thanks and those of his brother directors. For himself he felt that his failing health might compel him ere long to put off the harness, but he hoped the affairs of the company would still be administered by persons as sincerely desirous as he had always been to secure their efficiency and prosperity, and that the business would prove as successful in the future as it had done in the past.

THE GAS-METER COMPANY, LIMITED.

The Annual Meeting of the Shareholders of this Company was held on the 17th inst., at the Offices, 10, Coleman Street, City—A. ANGUS CROLL, Esq., in the chair.

The SECRETARY read the notice calling the meeting, and the following report of the directors:—

The directors herewith present the balance-sheet of the company duly audited for the year ending the 30th of June last.

From this it will be seen that the operations of the company have resulted in a profit of £8858 14s. 3d., after placing £1000 to a depreciation-fund, and after also writing off £500 from the works and plant at Oldham, agreeably with the announcement made in the directors report at the last general meeting.

This balance will allow of the payment of a dividend of 3 per cent. and of a bonus of 4 per cent. to the shareholders (making, with the interim dividend paid in April, 10 per cent. for the year), as well as a bonus of 4 per cent. on the whole capital to Messrs. Croll, Rait, and Co., for goodwill, according to the terms of the Articles of Association. After making these payments there remains £1084 3s. 7d. to be carried forward to the next account.

The directors have to announce that the balance of mortgage, amounting to £2500, which was left upon the works at Oldham, at the time the business at Oldham was taken over from Mrs. West, has been discharged within the year; and that the land which the company owned in the city of Manchester has been sold, yielding a profit of £1200, without reckoning interest for the money that had been employed in the purchase of that land. This profit has been carried to the credit of revenue in order that the whole amount of bad and doubtful ledger debts might be written off as if they were absolutely bad. The company has therefore now no debts, bad or doubtful.

It is with feelings of deep regret that the directors have to refer to the death of Mr. Rait. As is well known to the shareholders, his great ability and honesty of purpose were mainly instrumental in the establishment of the company which he successfully conducted for many years.

It will be remembered that, at the time of the last shareholders meeting, he was in failing health, and that he had obtained leave of absence for six months in the hope that a journey abroad and entire relief from business would re-establish his health. Unhappily the relaxation came too late, and he died on Oct. 24, 1871, and the directors feel persuaded that the shareholders will join with them in deploring the loss of his valuable services.

The shareholders are summoned by special notice to an extraordinary meeting to consider the propriety of redeeming and terminating the sums now paid in the shape of bonus to Messrs. Croll, Rait, and Co., for goodwill, as provided by the Articles of Association.

The directors are unanimously of opinion that it is for the best interests of the shareholders that the arrangement should be put an end to, and formal resolutions will be submitted to the extraordinary meeting to effect this object and the other arrangements consequent thereupon.

The directors who retire by rotation are H. P. Stephenson, Esq., and Horatio Brothers, Esq., who, being eligible, offer themselves for re-election.

W. Nottage, Esq., and W. H. Bennett, Esq., the auditors, also retire, and, being eligible, offer themselves for re-election.

The CHAIRMAN, in moving that the report and accounts be received and adopted, briefly adverted to the improved condition of the company, and adduced statistics warranting his expectation that the position of the company would steadily improve. He referred to the repayment of the mortgage on the Oldham works, and to the sale of the land at Manchester, at a profit of £1200, not including interest. He alluded to the proposed purchase by the company of the interest of himself and partners in the surplus profits of the company beyond 6 per cent., and, while thinking the sum offered small, he saw considerable advantage to the company by the purchase, and he, therefore, readily acquiesced in the proposal which was submitted to him by the directors. He would be pleased to answer any questions, and begged to move that the report and accounts be received, and adopted.

Mr. NICHOLSON seconded the motion, which was agreed to unanimously.

The retiring directors and auditors were re-elected.

A cordial vote of thanks was accorded to the chairman for his able conduct in the chair, and his attention to the interests of the company. Votes of thanks were also accorded to the general manager, secretary, and other officers of the company.

At the conclusion of the ordinary meeting, an extraordinary meeting was held, pursuant to notice, and the chairman of the company having vacated the chair, proposed that Mr. Nicholson preside, which was agreed to.

The notice having been read by the SECRETARY,

The CHAIRMAN explained very fully the reasons for the proposed purchase from Croll, Rait, and Co., of their bonus interest in the company, and the sum to be paid for it.

The provisional contract having been read, as also the special resolution to carry the same into effect, and answers having been given to questions put by the shareholders, the resolution was carried *nem. con.*, as was also the resolution amending the Articles of Association.

A vote of thanks to the directors for their able management of the affairs of the company closed the proceedings.

RIO DE JANEIRO GAS COMPANY, LIMITED.

An Extraordinary General Meeting of the Shareholders was held on Tuesday, Oct. 15, at the London Tavern, for the purpose of obtaining the sanction of the shareholders to an application to the Brazilian Government for an increase in the capital of the company. The chair was occupied by Baron DE MAUA.

The notice calling the meeting was read by Mr. THOMAS DAWSON, the secretary.

The CHAIRMAN said there had been some delay in calling the present meeting, because the directors wished to present themselves before the Brazilian Government backed by a very strong majority of the shareholders. The directors had to send to Brazil for the proxies of a large number of shareholders, who resided there, which had only lately arrived, and there was over three-fourths of the capital of the company represented at that meeting, either personally or by proxy. The object of the meeting was to obtain the sanction of the shareholders to increase the capital by £150,000, representing the reserve-fund, which was being laid out in the development of the enterprise, such as extending the pipes, increasing their power, and improving the works in every respect, so as to be in a better position to fully meet the wants of the city of Rio de Janeiro. There was no idea of asking the shareholders for any call in reference to this increase; it would be merely a nominal thing, because the reserve-fund already represented the present and future works; so the shareholders would get the benefit of a dividend on the new shares without being called upon to pay a single penny. In conclusion, the chairman formally moved the following resolution:—"That the board be and they are hereby authorized and directed to apply to the Imperial Government of Brazil for their sanction to the increase of the nominal capital of the company by £150,000, divided into 7500 shares of £20 each, to be allotted by the board in accordance with decisions of a general meeting of the company, and to the alteration of the fifth clause of the Memorandum of Association, so that, as altered, it shall be as follows, that is to say—'The nominal capital of the company is £750,000, in 37,500 shares of £20 each.'"

Mr. LEWIS HOWARD seconded the resolution.

A SHAREHOLDER: Do you think you will get the Government guarantee which you are asking for?

The CHAIRMAN said the directors had not the slightest doubt about it. He himself was going to Brazil shortly, and he had no doubt that it would be carried out without the slightest difficulty.

The resolution was then put to the meeting, and carried.

The CHAIRMAN: Gentlemen, we have to thank you for your kindness in attending, and I will add that the position of the company is in every way excellent, notwithstanding the rise in the price of coal, for we had taken care to have proper contracts beforehand, in order to be prepared to continue the company in a state of prosperity, such as every shareholder will be pleased with when the accounts are rendered.

Mr. JOHN HILLIARD moved a vote of thanks to the chairman and directors for the careful attention which they were paying to the interests of the company.

The resolution was seconded by Mr. Ross, and carried unanimously.

The CHAIRMAN acknowledged the compliment, and the proceedings terminated.

PUBLIC LIGHTING AT HEREFORD.

At the Monthly Meeting of the Hereford Town Council, on Tuesday, Oct. 1—the MAYOR (E. E. Bosley, Esq.) presiding,

The Gas Management Committee presented the following report:—

Gentlemen,—We have to report that the Gas Management Finance Committee have examined the accounts to the 25th inst., but the committee are unable to make up the capital account owing to their not being furnished with the particulars of the expenditure on purchase of works, plant, &c., and which they have directed the managers to apply to Mr. Smith, the finance clerk, for.

In accordance with the terms of payment with the late gas company, the committee have requested the manager to make up the account for public lamps and present them to this meeting for payment.

We have entered into a contract with Messrs. Buller and Co., of Bristol and Gloucester, for the surplus tar, at 20s. per ton: also arranged with the Great Western Railway Company to take the surplus coke at 14s. per ton.

We have decided upon charging private consumers of gas for the September quarter 4s. per 1000 cubic feet net, the same price we proposed to light the public lamps for, the arrangements for which we have not as yet completed with the Gas and Water Works Committee.

We have made a further purchase of 500 tons of gas coal, to be delivered in October, on rather more favourable terms than the last.

The new settings of retorts are progressing favourably, and the works generally are in a satisfactory condition.

Mr. JAMES, referring to the first paragraph in the report, in which the committee stated they were "unable to make up the capital account, owing to their not being furnished with the particulars of the expenditure on purchase of works, plant, &c., and which they have directed the manager to apply to Mr. Smith, the finance clerk, for," said that all the "particulars" had been presented to the council by the Special Gas Committee, and formed part of the records of the proceedings of the council.

The MAYOR said he perfectly well recollected hearing the statement read, but it had never been supplied to the manager of the gas-works. The chairman of the committee had asked the manager for it, but perhaps he had not applied to Mr. Smith for it.

Mr. JAMES read an extract from the report of the Special Gas Committee at the time of the works being purchased, in which all the particulars as to the amount of working capital which would be in the hands of the Gas Managing Committee the amount of purchase-money, &c., were fully set forth. It was not now, he said, a matter of importance; but it was only fair to the Special Gas Committee that this explanation should be given in answer to the paragraph in the Gas Managing Committee's report, to which he had referred. There was nothing at all to prevent that committee from obtaining the information which they required.

Mr. SHELLARD alluded to that part of the report which stated that, as to the price for public lamps, the arrangements were not as yet completed with the Gas Lighting and Water-Works Committee. Did that mean that the terms were to come up to the board to be completed that day? because he, as a member of the Gas Lighting and Water-Works Committee, understood that the terms were completed, subject to the approval of the council.

The MAYOR said that if the report of the Gas Lighting and Water-Works Committee had been first taken, the matter would perhaps have been explained. The Gas Managing Committee had not had any reply from the Gas Lighting and Water-Works Committee, and therefore did not know whether or not the terms had been accepted.

The TOWN-CLERK then read the following report of the Gas Lighting and Water-Works Committee:—

Gentlemen,—Your committee report that they have directed a gate to be fixed in the hedge leading to Mr. Fox's meadow for the use of the engine-driver, and to prevent persons trespassing on Mr. Fox's land.

We further report that on the application of Mr. Thomas Duckham, who has connected the row of houses known as Lawn's Terrace with the main sewer in Whitecross Street, we have assented to carry a 2-inch cast-iron water service along the road leading to Lawns Terrace, for the purpose of supplying the property with water, the cost of which will be about £14.

Your committee have received the following return of the cost of lighting the public lamps:—

"*To the Members of the Gas Lighting Committee.*

"Gentlemen,—In accordance with your instructions that I should make the necessary calculations as to the cost of lighting the public lamps for the ensuing twelve months, and also the rate required to meet the outlay, I beg to hand you the following return, showing the cost of lighting in each case; also the amount in the pound required to be levied, and the sum it will realise.

"The cost of lighting the public lamps with gas, to average 10½ hours per night, each lamp consuming 5 cubic feet per hour, at 4s. per 1000, inclusive of cleaning, lighting, and repairs, will be—

	For 1 Lamp.	For 410 Lamps.	Rate in the Pound.	Realizes.
If lighted for 9 instead of 10½ hours	£4 11 8 ..	£1880 ..	9d. ..	£1820
	4 0 9 ..	1655 ..	8d. ..	1616

"I am, gentlemen, your most obedient,

"THOMAS SMITH, Finance Clerk."

Your committee having gone fully into the matter, beg to recommend that the present system of lighting the public lamps be adopted—viz., 10½ hours per night.

Mr. BODENHAM moved the adoption of the report.

Mr. CARLESS, in seconding the motion, said that the committee went upon the principle that all the lamps in the city and the suburbs were to be lighted all the year round. Now he lived in the suburbs, a little distance from the city, and if the burning of the suburban lamps all night, both summer and winter, added to his convenience, it might be supposed that he should be an advocate for the principle. But he begged to state that he would willingly forego any advantage, for he thought it was a lavish expenditure to light all the lamps for three or four months in the summer time. Formerly there were lamps which were not lighted for four months, beginning with May and ending with August. In the beginning of May, and also at the end of August, there were sometimes dark nights, and four months might perhaps be too long a time; but he thought there would be no difficulty at all in the non-lighting of the suburban lamps for three months—namely, from the 15th of May to the 15th of August. He did not think that any inconvenience would be felt by the suburban residents, and it would materially affect the amount of the lighting rate.

Mr. JAMES said that Mr. Carless could not second the adoption of the report and at the same time move an amendment to it. Some other gentleman had better second the adoption of the report, and then Mr. Carless could propose his amendment.

Mr. SYMONDS said he would second the adoption of the report. The subject brought forward by Mr. Carless had been carefully discussed in committee, and he (Mr. Symonds) was for a long time of Mr. Carless's opinion. He had thought that great economy could be effected by the adoption of such a suggestion; but there was one unanswerable argument advanced against it, and that was that from the moment the suburban lamps were put out and darkness prevailed there was an increase in the number of cases on the police-sheets. If they asked the superintendent of police, he would tell them that he did not get half the number of cases on the police-sheets when the suburban lamps were lighted as he did when they were not lighted.

Mr. CARLESS, in proposing his amendment, admitted that it might be desirable to have the suburban lamps lighted all night all the year round, but he could not see the necessity for it.

Mr. SHELLARD submitted that the question had already been disposed of, the council having decided that all the lamps which were to be lighted should be lighted in the same way.

Mr. THOMAS DAVIES seconded Mr. Carless's amendment. He knew, he said, that a majority of the committee were in favour of lighting all night, but he and others thought that was a matter which the board should decide and not a committee of six. The rates were now very heavy; and he was not aware that the police reports showed that there were more depredations committed now than there were when the lamps were put out at twelve o'clock.

Mr. SHELLARD said that if Mr. Carless or his supporter could show that there would be any great reduction by their plan, that might perhaps be a reason why the council should adopt such an unfair and unjust plan. They had now the new Act before them, and the principle of it was to give uniformity to all ratepayers in their privileges and in their liabilities. The council had been going on steadily in that direction for a long time past; and now that the new Act had passed, he understood they had arrived at that happy point when all should be taxed alike as far as it was possible to be done. He could not understand the justice of putting out the suburban lamps for three months if the suburbs were to be continued within the privileged area. If the rate were to be levied uniformly, surely the lighting should also be uniform. If the amendment were carried, the rate would not be affected by more than ¼d. in the pound—certainly not ½d., and he did not think it would be ¼d. But even if the rate would be lessened to the extent of ½d. in the pound, he maintained that the council should not vote for the principle advocated by Mr. Carless and Mr. Davies. There was one other point he wished to notice. Although a member of the committee, he did not concur in their binding themselves to a twelve months agreement. If there should be an alteration in the price of coal, then at the end of six months the terms could be readjusted. That would have been fair to the Gas Managing Committee and to all parties; but his views were overruled by the other members of the committee.

Mr. RALPH did not think it desirable that they should now be increasing the lighting-rate. Within the last year or two the council had got the credit of decreasing the rates; and why they should now jump from a 7d. to a 9d. rate to carry out the theory that every one must have the same amount of light in the town, he really did not know. A large number of residents in the suburbs did not care a straw about having the lamps lighted there, and therefore he saw no necessity for increasing the rate from 7d. to 9d.

Mr. KEAY said Alderman Anthony's opinion was that good lighting was a very efficient police. He was anxious to know what the effect, as to the number of police cases, had been when the town was in total darkness, and the superintendent had said he did not know there was any addition. He had now again asked the superintendent, and the answer was the same.

Mr. E. SMITH believed a saving of 1d. in the pound in the rate would be effected, and surely that was worth a trial. They would save the consumption of 270 public lamps for three months in the year, and that must be considerable. He contended that if the suburban lamps were taken at 270, the saving would be nearly equal to a rate of a penny in the pound, even on Mr. James's own showing. There were some lamps in the suburbs where there was no property in the immediate vicinity to pay anything towards the cost, and the city had to bear the expense.

The MAYOR said there were two courses taken—one of economy, and the other of equal privileges and equal liabilities. The economy part of the subject had been pretty well discussed. If they took the alternative scheme, that recommended by the committee, they would have to pay an extra penny in the pound in the rate; if Mr. Smith's scheme, the saving would perhaps be a halfpenny in the pound in the rate. He would put it to every person in the suburbs rated at £20 a year, whether he would like to be placed in the same dilemma the city was recently in, the streets being quite benighted for the sake of 1s. 8d. a year? The new Act had now just come into force, and the council ought to treat all alike, as that was one of the objects contemplated by it. There might, perhaps, be discretion given to the Gas Managing Committee as to lighting all the lamps on moonlight nights; but otherwise he thought they should adopt the principle of lighting all the year round. If any saving could be effected by not lighting some lamps on moonlight nights, it would go into the funds for the benefit of the city.

Mr. GARROLD submitted that the council had not before them any definite proposition as to the lamps which it was proposed should be put out, but simply what were called suburban lamps. Mr. James put the suburban lamps at 200, and Mr. Smith at 270; but the council ought to know to what lamps the amendment referred. For the credit of the city of Hereford, he hoped the council, with their present facilities for lighting the city, would not retrograde by putting out any of the lamps. No one could deny the fact that a lamp was a good policeman. There might have been an increase of crime in the city, but he did not think any one would say that light was not a deterrent from crime. Where the city was well lighted, there the commission of crime was deterred; but if they put out the light they must expect crime to increase.

A division was then taken, and Mr. Carless's amendment was negatived by 11 to 7.

The report of the Gas Lighting and Water-Works Committees was adopted, and the council then reverted to the Gas Managing Committee's report.

Mr. THOMAS DAVIES proposed—"That the Gas Managing Committee have discretionary power to order that the outside and what other lamps they may consider unnecessary to light during the nights of moonlight in each month be not lighted." There were, he said, six nights in every month in which there was no cause for the lamps to be lighted. He was not speaking as to the city, but as to the suburbs, and there he thought it to be quite ridiculous to light the lamps at the full of the moon. He could easily understand that the manager would not like to take upon himself this responsibility, but the committee might do so; 300 lamps, in a period of 10½ hours, would burn something like 13,000 cubic feet of gas. Multiplying that by 6, and then by 13, they would get a very considerable quantity of gas which was now thrown away; but if they could only save £50 or £60 a year, it was important that they should do so.

Mr. JAMES: Are the committee to meet every evening during the moonlight nights for the purpose of settling the question whether or not it will then be light?

Mr. DAVIES: They meet once a week.

Mr. JAMES: But have they the power of prophecy, so as to know whether it is going to be light or not on those particular nights?

Mr. RALPH, in seconding Mr. Davies's motion, contended that those who were in favour of the plan recommended by the committee were advocates of a retrograde movement, and not those who were opposed to it; for it must be a retrograde movement to increase the rate unnecessarily from 7d. to 9d.

Mr. GARROLD considered the scheme impracticable; but, assuming that it might be practicable, he should like to see the committee have such power. He, however, felt quite sure that it could not be done.

Mr. LLANWARNE moved an amendment—"That the Gas Managing Committee be empowered to resign before taking upon themselves to determine the question of what was or what was not a light night." He was sure they could not po that to their own satisfaction, much less to the satisfaction of others. It was, therefore, only fair to the Gas Managing Committee, of which he was one, that they should be allowed to resign before attempting to carry out such a proposition.

Mr. E. SMITH said he would second Mr. Llanwarne's amendment, because if the Gas Managing Committee could not try to carry out the proposed arrangement, he thought they ought to be allowed to retire. At present it was really a case of "Gas *versus* Moon," a waste, on many nights, of gas which they ought to save. The gas being the property of the corporation, they ought to try and save as much as they possibly could do, because the amount saved would go into the pockets of the ratepayers.

Mr. SYMONDS reminded the council that Gloucester, Cheltenham, Cardiff, and many other places, had uniformly adopted the plan of burning all night all the year round. There was not, he was sure, a man in the room who would not be glad to see the lamps put out on moonlight nights, if it were practicable to do so with any substantial beneficial result; but the difficulties were such—as to the ordering of the men and in other ways—that the committee were all agreed that it could not be done.

Mr. SHELLARD said that Hereford had found this out by experience. The subject had been discussed and rediscussed over and over again, and, after a variety of suggestions, it was determined that they should do what other towns had done. On the face of it there might appear to be some saving, but really the saving that could be effected was not worth the words which had been wasted on the subject.

The MAYOR agreed with Mr. Davies that the council should save all they could, and he hoped the Gas Managing Committee were not so indifferent to their duties as Mr. Smith had inferred they were, but were anxious to exercise sound economy. He believed it was the intention of the committee to economize as much as they possibly could do, but the work was new to them, though he had no doubt they would master it by-and-by. If they were incompetent for their duties, he, for one, should be happy to give place to Mr. Smith, or to any one more competent than himself. His worship concluded by advocating the principle of lighting all the lamps all the year round, and hoped Mr. Davies would withdraw his motion, much as he agreed with the motive by which he was actuated.

The votes were then taken. There were 5 for the motion and 8 against it.

Mr. THOMAS DAVIES laid before the council a memorial, signed by 19 residents in West View Terrace, Canal Road, complaining of the want of public lamps on that part of the road lying towards the wharf, the nearest being by the British Oak Inn. The memorialists drew a gloomy picture of the risks to which they and their families were exposed in going home in the dark, there being often loaded timber carriages left in the road all night, while the road itself was represented as being remarkable for its muddy condition. Their prayer to the council therefore was, "Lighten our darkness, we beseech you, and as far as lies in your power protect us from dirt and danger." They suggested the erection of at least two lamps before the dark nights of winter came on.

Eventually the matter was referred to the Gas Lighting Committee.

ST. ALBANS GAS SUPPLY.—In consequence of the great increase in the demand for gas in this town, it was deemed necessary by the directors of the gas company to construct an additional gasholder on a large scale, the whole responsibility of which has devolved on our present talented engineer and gas manager, Mr. A. F. Phillips, of St. Albans, to whom great credit is due for his plans, and the carrying out and completion of the important undertaking. This gasometer is probably the largest in the county. The subjoined details of material used will give an idea of its large dimensions. During the recent improvements, 3266 yards of earth were removed, which does not include its subsequent removal to fill up. In the construction there have been used 357 cubic yards of clay puddle, 170,800 hard bricks, 31 tons of stone, 1900 bushels of Portland cement, 2½ tons of lime, 298 yards of concrete, and 2730 bushels of clean washed sand. The gas-works on the whole are worthy of a visit, being replete with every improvement of modern science. A short time since 72 gas shares realized £15 per share, and a residence, formerly the Railway Tavern, adjoining the works, has been recently purchased by the company and fitted up as a permanent villa residence for the engineer.—*Luton Advertiser.*

LONDON GASLIGHT COMPANY.

The Ordinary Half-Yearly Meeting of Proprietors was held at the Freemasons Tavern, on Wednesday, Oct. 9—J. R. Hall, Esq. (the governor), presiding.

The Secretary (Mr. A. J. Dove) read the advertisement convening the meeting, and the register of shareholders having been sealed, the following report and statements of account were submitted:—

Annexed to this report your directors submit the half-yearly accounts, showing the result of the manufacture and distribution of the company's gas up to the 30th day of June, 1872. After appropriating £750 to the redemption-fund, in accordance with the provisions of the London Gaslight Act, 1857, the sum of £24,949 15s. 1d. remains applicable to dividend; and the directors recommend that dividends be declared on all classes of preference stocks and shares, and a dividend at the rate of £10 per cent. per annum on the ordinary stock. Such dividends to be paid on the 15th of October, 1872.

The extra cost of materials used in the manufacture of gas, and required for the maintenance of the works, together with the higher rate of wages, has tended to reduce the profits of the half year.

In the item of coal, for instance, there has been an increase, as compared with the corresponding half year, of £6918. To meet the deficiency in the amount required for the usual rate of dividend, £3634 5s. 6d. will have to be taken from the reserved fund.

Several gas companies, to meet the present and anticipated deficiencies in their profits, have increased the price of their gas. Your directors, however, are looking forward to the results of advantageous contracts they have concluded for the sale of products, to improvements of manufacture in course of being carried out, and to abatements in the present exceptionally high prices of coal and other materials; and relying on these sources, they abstain for the present from increasing the price of the gas.

Your directors trust that the new gasholder referred to in the last report will be ready for use this winter. Other works are also progressing, but great difficulty is experienced in assuring the execution of contracts for ironwork within the periods stipulated.

A.—STATEMENT OF STOCK AND SHARE CAPITAL, *on June* 30, 1872.

1. Acts of Parliament authorizing the Raising of Capital.	2. Description of Capital.	3. Maximum Dividend authorized.	4. Number of Shares issued.	5. Nominal Amount of Share.	6. Called up per Share.	7. Total paid up.	8. Amount issued but not paid up.	9. Remaining to be issued.	10. Total Amounts authorized.
15 Vict., cap. 82	Ordinary stock.	10 per cent.	Stock	Stock	Stock	£375,600	..	..	£375,600
	2nd pref. „	6 ditto.	Do.	Do.	Do.	16,200	..	..	16,200
	3rd ditto „	6 ditto.	Do.	Do.	Do.	5,350	..	..	5,350
	1st ditto „	6 ditto.	Do.	Do.	Do.	150,000	..	..	150,000
29 Vict., cap. 55	A ditto	6 ditto.	7622	£25 0 0	£12 10 0	134,638	£55,912	£109,450	300,000
20 & 21 Vict., cap. 73	Debenture stks.	5&6 ditto.	Stock	Stock	Stock	28,173	..	..	28,173
						£709,961			

B.—STATEMENT OF LOAN CAPITAL, *on June* 30, 1872.

1. Acts of Parliament under which borrowed.	2. Description of Loan.	3. Rate per cent. of Interest.	4. Total Amounts borrowed at June 30, 1872.	5. Remaining to be borrowed.	6. Total Amounts authorized.
15 Vict., cap. 82	Bond, &c.	4½ and 5.	£91,667	..	£91,667
29 Vict., cap. 55	Ditto	Do.	19,025	£71,332	100,000
			£110,692		

Total stock and share capital paid up (*see* A), £709,961; ditto loan ditto borrowed (*see* B), £110,692; total capital received, £820,653.

C.—CAPITAL ACCOUNT, *for the Half Year ended June* 30, 1872.

Dr. *Cr.*

		Total to June 30, 1872.
1. To Expenditure, to Dec. 31, 1871		£779,210 8 5
Since that date—		
2. New buildings, manufacturing plant, machines, storeage works, and other structures connected with manufacture	£8,271 17 2	
3. Ditto mains and service-pipes, including laying same, paving, and other works connected with distribution	271 10 10	
	8,543 8 0	
4. Less excess in meters returned to store	48 1 9	
		8,495 6 3
		787,705 14 8
5. Balance		14,623 17 6
Total expenditure		802,329 12 2
To balance of capital account		18,323 15 4
		£820,653 7 6

	Certified Receipts to Dec. 31, 1871.	Received during Half Year.	Total Receipts to June 30, 1872.
1. By Ordinary stock	£374,800 0 0	* £800 0 0	£375,600 0 0
2. 2nd preference stock	16,200 0 0	..	16,200 0 0
3. 3rd ditto ditto	6,150 0 0	†	5,350 0 0
4. 1st ditto ditto	150,000 0 0	..	150,000 0 0
5. A ditto shares, £25 each, including amount received in anticipation of calls.	123,655 0 0	10,982 10 0	134,637 10 0
6. Debenture stocks, under 20 & 21 Vict., cap. 73.	28,205 7 6	‡	28,173 17 6
7. Bonds and other loans	111,292 0 0	‖	110,692 0 0
Note *) £800 converted into ordinary stock.			
†)			
‡ £31 10s. redeemed.			
‖ £600 do.			
	£810,302 7 6	..	£820,653 7 6

Dr. *Cr.*

D.—REVENUE ACCOUNT, *for the Half Year ended June* 30, 1872.

To Manufacture of gas—			
1. Coals, including dues, carriage, unloading, and all expenses of depositing same on works	£42,801 0 11		
2. Purifying materials, oil, water, and sundries at works	782 13 1		
3. Salaries of engineers, including chief engineer, superintendents, and officers at works	1,547 17 0		
4. Wages and gratuities at works	9,673 19 3		
5. Repairs and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour	8,963 11 11		
	63,769 2 2		
Less old material sold	164 9 2		
		£63,604 13 0	
5A. The Gaslight and Coke Company, for cannel gas		5,164 18 11	
Distribution of gas—			
6. Salaries of surveyor, chief inspector, inspectors, assistant inspectors, and clerks in Light Office	1,616 17 7		
7. Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour	1,302 13 5		
8. Repairing, renewing, and refixing meters	1,634 5 2		
		4,553 16 2	
Public lamps—			
9. Lighting and repairing		1,452 5 8	
Rents, rates, and taxes—			
10. Rents	934 13 0		
11. Rates and taxes	3,189 18 8		
		4,124 11 8	
Management—			
12. Directors allowances	900 0 0		
13. Salaries of secretary, accountant, and clerks, office-keepers, and messengers	711 17 2		
14. Collectors commission and salaries	1,667 18 0		
15. Stationery and printing	343 8 5		
16. General establishment charges and incidentals	275 8 11		
17. Company's auditors	50 0 0		
		3,948 12 6	
Law and parliamentary charges—			
18. Law	230 3 4		
19. Parliamentary (oppositions)	..		
		230 3 4	
20. Depreciation-fund for works on leasehold lands		100 0 0	
21. Bad debts		446 3 9	
22. Repairs of houses		571 1 3	
Total expenditure		84,196 6 3	
Balance carried to profit and loss account (E)		28,270 2 7	
		£112,466 8 10	

By Sale of gas—		
1. Common gas (388,387,500 cubic feet), at 3s. 9d. per 1000 cubic feet	£72,822 12 11	
2. Cannel gas (21,994,200 cubic feet), at 5s. per 1000 cubic feet	5,498 10 11	
3. Public lighting and under contracts (common and cannel gas)	10,239 13 4	
		£88,560 17 2
4. Rental of meters		1,836 2 0
		90,396 19 2
Residual products—		
5. Coke, less labour and cartage	15,453 0 8	
6. Breeze	437 8 1	
7. Tar	3,370 13 7	
8. Ammoniacal liquor	1,388 8 4	
		20,649 10 8
9. Rents		1,403 9 0
10. Transfer fees		11 10 0
Total receipts		£112,466 8 10

E.—PROFIT AND LOSS ACCOUNT (NET REVENUE), *for the Half Year ended June 30, 1872.*

Dr.			Cr.		
1. To Amount carried to reserved fund account (F) from profits, to Dec. 31, 1871	£1,719	0 1	1. By Balance of net profit brought from last account . £30,130 3 5 Less dividend paid for the half year ended Dec. 31, 1871 . . . . . 28,411 3 4	£1,719	0 1
2. Interest on temporary loans and bonds	2,677	5 9	2. Balance brought from revenue account (D), being profit for the half year, to June 30, 1872	28,270	2 7
3. Redemption-fund, reserve per London Gaslight Act, 1857	750	0 0	3. Interest on moneys deposited	106	18 3
Balance of net profit to be carried to next account, subject to half year's dividends	24,949	15 1			
	£30,096	0 11		£30,096	0 11

F.—RESERVED FUND ACCOUNT, *for the Half Year ended June 30, 1872.*

Dr.		Cr.		
To Balance	£23,052 15 11	1. By Balance brought from last account	£21,035	19 6
		2. Amount brought from profit and loss account (E)	1,719	0 1
		3. Interest on amount invested	297	16 4
	£23,052 15 11		£23,052	15 11

G.—DEPRECIATION-FUND ACCOUNT (for Works on Leasehold Lands), *for the Half Year ended June 30, 1872.*

Dr.		Cr.		
To Balance	£700 0 0	1. By Balance brought from last account	£600	0 0
		2. Amount brought from revenue account (D)	100	0 0
	£700 0 0		£700	0 0

H.—STATEMENT OF COALS, *during the Half Year ended June 30, 1872.*

Description of Coal.	In Store, Dec. 31, 1871.	Received during Half Year.	Carbonized or used during Half Year.	In Store, June 30, 1872.
	Tons.	Tons.	Tons.	Tons.
Common	3,974·9	58,500·10	50,853·12	11,621·7
Cannel	707·1	2,954·15	2,554·18	1,106·18

I.—STATEMENT OF RESIDUAL PRODUCTS, *for the Half Year ended June 30, 1872.*

Description of Residual.	In Store, Dec. 31, 1871. Estimated.	Made during Half Year. Estimated.	Used in Manufacture during Half Year. Estimated.	Sold during Half Year.	In Store, June 30, 1872. Estimated.
Coke— Common . . . chaldrons, Cannel . . . 36 bush.	1,507	47,930	9,536·8	39,700·4	200
Breeze . . . chaldrons.	500	6,353	592	6,211	50
Tar . . . gallons.	133,000	493,792	..	553,792	78,000
Ammoniacal liquor . . . butts of 108 g.	1,648	7,264	..	8,116	796

J.—GENERAL BALANCE-SHEET, *on June 30, 1872.*

Dr.				Cr.			
1. To Capital account— Balance at credit thereof (Account C)		£18,323	15 4	1. By Cash at bankers and in hand		£17,210	16 1
2. Profit and loss account— Balance at credit thereof (Account E)		24,949	15 1	2. Do. on deposit or at interest		10,000	0 0
3. Reserved fund account— Balance at credit thereof (Account F)		23,052	15 11	3. Coals—for stock on hand	£11,471 17 0		
4. Depreciation-fund account (for works on leasehold lands)— Balance at credit thereof (Account G)		700	0 0	4. Coke and breeze—ditto	90 0 0		
5. Redemption-fund		1,349	15 6	5. Tar and other products—ditto	796 9 6		
6. Unpaid dividends		3,214	9 0	6. Sundry stores—ditto	3,461 3 9		
7. Interest accrued and unpaid on bonds and other loans		1,323	14 6			15,819	10 3
8. Sundry tradesmen and others, for amount due for coals, stores, &c.		34,932	12 7	7. Gas and meter rental—balance of this account due to the company, less deposits and pre-payments	33,230 8 8		
				8. Coke and other residuals—balance of these accounts due to the company	6,427 19 10		
				9. Sundry accounts	2,105 7 2	41,763	15 8
				10. Investment account		23,052	15 11
		£107,846	17 11			£107,846	17 11

The GOVERNOR: Gentlemen, it is now my duty to call your attention to the report, and move its adoption. The report is certainly a very short one, but I believe it contains all that it is requisite to bring under your notice on the present occasion. You must have expected, as stated in the report, that the extra cost of material used in the manufacture of gas and required for the maintenance of the works, together with the higher rate of wages, have tended to reduce the profits of the half year. It has been so, I may say, to a considerable extent, because we have generally put by something to the reserve-fund, whereas we are obliged to-day to take from that fund the sum of £3634 to meet the deficiency in the amount of profit required for the usual rate of dividend. Our anxious attention has been directed to obtain coal at a less cost than some other companies have had to pay. We have continued to deal with the same firm, and they have met us in a very satisfactory way. I can recollect the time when we had not a waggon-load of coal in store, but now I am happy to say we have 20,000 tons, the largest stock this company ever possessed in October of any year. We have felt the inconvenience of a want of coal in past years, and therefore, profiting by our experience, we have taken steps to secure a large stock in store, and now we are looking forward to the future with hope that we may still be able to carry on the concern with advantage to our shareholders. You will see by the report that there is a deficiency in the profits of the half year to allow of the payment of the usual amount of dividends on this occasion. Many companies throughout the country have resorted to an increase in the price of gas to make up their deficiency in some cases to the extent of even 25 per cent., owing to the increased cost of coal and iron and the advance in the rate of wages and other things. Well, gentlemen, we have looked most anxiously and carefully into this question, and having a reserve-fund which has been provided for the purpose of equalizing dividends, we have had no hesitation in resorting to that fund to make up our dividends on the present occasion, rather than adopt the course of increasing the price of gas. And while doing this, we are not without hope that, with strict economy, and by means of the improvements now going on upon the works, we may still be enabled to avert the necessity for taking that step, which, as you all know, would be most unpopular with our consumers. We have not, as you may suppose, been without considerable anxiety in carrying on your affairs. For some years past the gas question in Parliament and with the public occupied much of our attention, but we have now reached a tranquil state, and we do not desire to give any one the opportunity for again agitating that question. So long as we have it in our power to continue the present rate of dividend to our shareholders, we do not desire to do anything in which the public will not go along with us and approve the course we adopt. We think, therefore, that you will not consider us wrong in making up the deficiency of £3634 5s. 6d. out of our reserve-fund on this occasion. We do not see that there is any reason for reducing the dividend below 10 per cent. That is our maximum; we cannot go beyond it, but we think we ought to maintain it; and, therefore, as I said, we have, after mature consideration, come to the resolution thereon which is stated in the report, to take the necessary sum from our reserve-fund, which, as you know, exceeds £20,000. I am not aware of anything further that I need state respecting the report and the accounts, but if any shareholder present desires additional information, I shall be most happy to furnish it. To enable you to ask any questions, I will move—"That the report of the directors and the accounts now laid before the meeting be received and adopted."

The DEPUTY-GOVERNOR (Mr. Major Rohde Hawkins) seconded the motion.

Mr. FORD: I think there can be no doubt that the increased cost of materials used in the manufacture of gas, together with the higher rate of wages, has given to the half-yearly reports, accounts, and meetings of the several gas companies of the metropolis an exceptional interest and importance, not simply to the shareholders, but to the consumers, and also to those critical gentlemen who periodically constitute themselves into grievance committees for the purpose of obtaining a reduction in the price of gas, or, failing to do that, to bring about dissensions between directors and consumers. Now, the salient point about our report to-day is the application of a portion of our reserve-fund to make up the half year's dividend. That, of course, is a serious question of policy in the management of a gas company, and it is a question of such importance that I do not think the shareholders of this company would be doing their duty to the directors who represent them if they were not prepared at once to express their approval or disapproval of that course. For my own part, I most heartily express my unqualified approval of the course adopted by the directors of this company. I think it would have been a most unwise course for the directors of any company, after the agitation which has prevailed upon the subject of the price of gas, had they, immediately an increase took place in the cost of any commodity, made that a pretence for raising the price of gas to the public, and I am sure that so far as the customers of this company are concerned it would have given rise to great discontent. I think our directors have legitimately fallen back upon that fund which was created to meet an exceptional state of things like the present. If it should be found in the course of two or three half years that the cost of materials and labour continues to rise, the public, I presume, will feel the absolute necessity that we should have an increase in the price of the article we manufacture in order to recoup us for the capital invested in the concern. With these observations I have nothing further to say upon the subject of the report. But, passing from this point, I take it to be legitimately within the scope of my observations to refer to a circular issued by the secretary, calling upon the holders of the A preference shares to express their willingness to assent or dissent to the course indicated in that circular. Perhaps, however, before mentioning this matter I may ask a question for the satisfaction of the shareholders generally. I believe we have the power from time to time, as it may be necessary, to increase our reserve-fund to £85,000?

The GOVERNOR: We have.

Mr. FORD: And we have now a very ample reserve, after taking the £3634 to-day?

The GOVERNOR: Yes.

Mr. FORD: Now, the circular to which I call attention is this, and I would not mention it if I did not know that the opinion I entertain and express is shared in by many of the holders of A preference shares. The question pro-

pounded by the circular is whether the holders of those 6 per cent. preference shares would like shortly to pay up the amount remaining uncalled upon them; and, if so, whether they would be content to receive 5 per cent. till the calls are made. I must confess, if it is intended by that circular to intimate that the company are to recede from the position which was taken with the holders of those 6 per cent. shares, I think it virtually amounts to a retractation of the implied contract entered into with them. This company, at the time those shares were issued, were not in so prosperous a condition as they now are, and I feel that it not fair, for the sake of saving a paltry 1 per cent., for the directors to take a step which bears the semblance of breaking faith with a particular class. If it was convenient for them to raise the money at 6 per cent. at one time, it might not be convenient to the persons who had to pay it; but the directors should take the average of the position of the money market, and I think, whenever they require money for the purposes of the company, they ought to raise it on the preference shares, to the advantage or disadvantage of those shares. I confess that I have calls unpaid, and it is a matter of regret to me that I took those shares; for until those calls are paid my affairs are to a certain extent unsettled, and if I pass away I leave an incumbrance which now I am fully prepared to meet. I should, therefore, like to have an explanation from the governor as to why the board have had recourse to the holders of these shares in the way indicated.

Mr. DOANE: I should like to ask whether any other company have made overtures to this company with a view to an amalgamation. I may say that I am a holder of 6 per cent. shares, and it appeared to me that if the directors could give us certain periods when the calls upon them would be paid up, the course they have indicated would not be objectionable. But if they obtain payment on those calls in advance, they would have no necessity or inducement to make calls, and, therefore, they would be practically reducing our interest from 6 to 5 per cent.

The GOVERNOR: In reply to the observations of Mr. Ford, I would say that it is not the policy or the desire of the directors to possess more capital in this concern than they actually require for the working of it. That is the first principle we have laid down; we do not desire to have money unless we can profitably use it, because we have to look to the entire body of shareholders, and it would not be economical or advantageous when economy is the order of the day. The amount due as calls upon the class A preference shares was £55,912. The company wanted a sum of money to lay out during the past half year, but to have made a call for the whole of that amount would have given us more capital in hand than we required. Certain individuals had intimated their wish from time to time to pay up their calls, but inasmuch as we could, if we pleased, borrow money at a lower rate than 5 per cent., the directors, with the intention of meeting the desire of those shareholders who were ready and willing to pay up, consented to take from them a sum of money amounting altogether to £10,982, and allow them 5 per cent. for payments in advance of their calls. The directors did this under the authority of Parliament—the authority under which the shares were issued—that anybody who takes shares in a company may, if the directors think proper, pay up the amount due on those shares on such terms as the directors fix. We felt that there were a sufficient number of these shareholders ready and willing to pay up the amount required at 5 per cent. before we entered into the arrangement referred to. As I said, £10,982 has been thus paid up, and whenever the calls are made on these shares they will be credited with the amount so paid in advance. But it was a matter of convenience not to have more money in hand than we knew what to do with. This reduces the unpaid calls on these share to about £45,000, and the steps we took in the matter were for the benefit of the company, and not us personally. With regard to the question of amalgamation, I am happy to say we are standing as well as most companies in London in reference to our neighbours. A private application—not an official communication—was made by one company to us. Some of their directors met some members of our board, and suggested an amalgamation of three companies. We said we should be happy to amalgamate on the terms suggested, but as the third company did not come in on the same terms the thing went off. I believe there are companies in London who think we stand in such a position that it would be desirable to amalgamate with us, and we shall be perfectly ready to meet those companies and amalgamate with them. We have gone into the question as far as we can, but we do not think, as regards the cost of manufacture, any saving could be effected by such an arrangement. So far as regards the details of office management, clerks, inspection, and lighting, we do not think they can be reduced. Probably some expenses might be economized, and whenever an application is made to us, and we see any prospect of a satisfactory arrangement, we shall be happy to entertain it. We did not throw cold water upon the project, but the terms required by No. 3 company did not appear right, and we did not proceed with it. With reference to the other inquiry, I may observe that it is difficult to say when we may want money, but we will take care to give the longest notice to shareholders when calls will be made. We cannot say that our capital account is closed; we shall want money for gasholders and other things, but it is a matter of convenience to us to take the money as we have taken it.

The motion was then put, and carried unanimously.

On the motion of the GOVERNOR, it was resolved—"That the following dividends be declared—viz., the fixed dividends on all classes of preference stocks and shares, and a dividend at the rate of 10 per cent. per annum on the ordinary stock, for the half year ending June 30, payable on the 15th inst."

A vote of thanks was given to the directors for their able management of the affairs of the company, which the chairman suitably acknowledged, and the proceedings terminated.

WEST OF SCOTLAND ASSOCIATION OF GAS MANAGERS.

The First Meeting of the West of Scotland Association of Gas Managers was held in the Academy, College Street, Dumbarton, on Friday, the 11th inst.—Mr. WILLIAM KEY, Dumbarton, occupying the chair.

The CHAIRMAN proceeded to address the meeting as follows:—We have to thank each of the gentlemen here present for the very cordial manner in which he has responded to the invitation, considering the short notice. Your presence, and the distance some of you have travelled, as our friend here, Mr. Robertson, from Campbeltown, shows the interest at heart in the proceedings of this day. I have to explain that I address you on behalf of the other four gentlemen, who, along with myself, had at first entertained the very desirable object of forming this association. I was empowered by these gentlemen to correspond with you, and I feel it to be a great honour to represent them, as well as to address you on the subject of our present meeting. In referring to the various conferences we have had, I may state it has always been our opinion that a great deal remains to be done in the promoting of intercourse among gas managers, especially those over small works. We proposed forming this association for the object of promoting the circulation of knowledge in all matters connected with gas manufacture and management, and to encourage the exchange of opinions; the ordinary members of the association to be managers of lesser works, where the annual manufacture does not exceed 30 million cubic feet of gas. You will acknowledge that by such intercourse only can we become acquainted with each other and each other's opinions and experience on all the details of our profession, that we, in turn, can become experienced ourselves. It is highly desirable that we meet occasionally for this purpose, that we may give vent to our ideas in conversation upon topics before us, as also the hearing of papers on subjects relating to gas manufacture and management, whereby we may profit as well as the companies we represent. This object I have great pleasure in saying is evidently soon to be accomplished. We found that the influence of the annual general meeting of the North British Association did not come home to a large majority of managers of small works, and the proposed amalgamation with the British Association will put it beyond the hope of managers of lesser works to be able to attend its sittings. The meetings of the North British Association of Gas Managers being held annually, such meetings may be at a very considerable distance, thereby rendering it impossible for managers of small works to attend, and also by such distance the expense of attending is considerable; and I am sorry to say, at present, generally, the managers have to defray such out of their own pockets. We would hope to fill up this want in respect of meetings, and direct our attention with combined effort to do our best for the companies we serve. It is proposed that this association be called the "West of Scotland Association of Gas Managers," and that its members meet quarterly, and each time in a different locality, whereby many could attend every meeting and others twice or three times a year, as it may suit the convenience of members, it being agreed at each meeting where and when the next meeting will be held. The need of this association has also lately been considered more necessary than heretofore owing to the critical times in which we live, the prices of material to work upon, and labour to work with. These are doubly telling in the working of our small works. There are also other matters that have come to our knowledge requiring attention. It will be the aim of the committee to consider any communications from members, and give advice thereon in any matter that may be desired. I have every confidence in the success of the scheme, as, by representing the lesser works, we represent the majority, and come in direct contact with opinions and things common to us all. I have now, gentlemen, to lay before you, for your consideration, the proposition to establish a "managers fund" in connexion with this association. We cannot expect to meet with unqualified success, but must prepare ourselves for some difference of opinion, and opposition, both in carrying out the scheme of the "West of Scotland Association of Gas Managers" and the "managers fund" in connexion therewith; but we have confidence, with an average amount of our native energy, it will prove a success, and of great utility to its members and the profession at large. Having now explained to you the origin and aim of this association, I will read several of the letters received, read over the rules for your approval, lay on the table the proposition as to the managers fund, then we will proceed to elect office-bearers.

It was found that the fifteen letters received were all agreeable as to the formation of the association and managers fund, one only having expressed doubts as to the success of the latter scheme.

The rules and regulations were adopted as read, and copies ordered to be printed and distributed among members.

The formation of a "managers fund" was unanimously approved of, it being proposed and agreed to that cards be printed and issued to ordinary members for contributions, beside the usual members subscriptions, which were held as not being compulsory; the committee being empowered to conduct the business of the fund, and report on the means of its administration at next general meeting.

Mr. DUNCAN JEFFREY (Kirkintilloch) then proposed Mr. Key to be president of the association for the ensuing year, which was seconded by Mr. JOHN HALL (Port Glasgow), and Mr. Key was unanimously elected.

Mr. JAMES RENFREW (Langbank) proposed Mr. Thos. Blair (Alexandria), N.B., as vice-president for the ensuing year; seconded by Mr. ALEX. BROWN (Kilsyth), and agreed to.

Mr. JAMES BLACK (Old Kilpatrick) proposed Mr. John Learmouth (Milngaire) as secretary and treasurer, seconded by Mr. JOHN HALL (Port Glasgow), and agreed to; and that Mr. Key act as interim secretary and treasurer till next meeting.

The following gentlemen were unanimously appointed members of committee: Mr. John Hall, Port Glasgow (proposed by Mr. Thos. Blair, seconded by Mr. D. Jeffrey); Mr. William Smith, Helensburgh (proposed by Mr. Wm. Robertson, Campbeltown, and seconded by Mr. T. Blair); Mr. Duncan Jeffrey, Kirkintilloch (proposed by Mr. T. Blair, and seconded by Mr. John Hall); and Mr. James Black, Old Kilpatrick (proposed by Mr. Wm. Robertson, seconded by Mr. Wm. Smith).

Mr. Wm. Robertson (Campbeltown), on the motion of the PRESIDENT, was unanimously elected auditor.

On Mr. KEY's motion, it was agreed that a list be taken of members who do not obtain the JOURNAL OF GAS LIGHTING; whereupon several managers intimated their intention to request the JOURNAL to be supplied them by their respective companies, and meanwhile a list was taken of the remainder, and the secretary instructed to order from the publisher a few copies to be sent regularly to the association for circulation, it being understood that such members keep the JOURNAL only part of two days and one night, paying postage to next member on list, and returning to secretary as the property of the association.

Mr. WM. SMITH proposed that an abstract of proceedings at general meetings of the association be forwarded to the editor of the JOURNAL OF GAS LIGHTING for insertion as soon after each meeting as possible, which was agreed to. It was also agreed that the contribution list towards the "managers fund" be made public, by inserting same in the JOURNAL OF GAS LIGHTING from time to time.

On the motion of Mr. J. HALL, it was approved that next meeting be held on the second Thursday in March, 1873.

On the motion of Mr. T. BLAIR, it was agreed that the next meeting be held in Kirkintilloch, when Mr. Jeffrey rose and thanked the members for conferring the visit on his locality, and assuring the association that they would find ample accommodation for the meeting at their disposal.

After a lengthened conversation on various matters of interest, and in connexion with details in gas-works management,

The PRESIDENT moved a hearty vote of thanks to Peter Denny, Esq., for the kind manner he had put the Academy Hall to the use of the association, which was carried by acclamation.

The proceedings were then closed, and members visited the extensive Marine Engine Works of Messrs. Denny and Co., and afterwards dined together at the Elephant Hotel—Mr. Wm. Key in the chair, Mr. T. Blair croupier.

SHIPLEY WATER SUPPLY.—The Shipley Local Board are commencing the construction of a storeage reservoir at Graincliff, about three and a half miles north-west of Shipley, upon the upper part of the Eldwick Beck. The embankment will be situated at the northern extremity of Intake Wood, about half-a-mile above the present Eldwick Beck reservoir, also the property of the local board, which the new reservoir is intended to supplement, the water from the lower reservoir being chiefly required for compensation purposes. In dry weather, the water for the supply of Shipley will be let down the stream as far as the upper end of the Eldwick Beck reservoir, whence it will be conveyed in the present conduit to the service reservoirs below Baildon Hill. The new reservoir is being constructed according to the designs of Mr. Filliter, engineer to the Leeds Water-Works. Its capacity will be about 80 million gallons, the greatest depth of water being 55 feet. The embankment will be 1300 feet long, and will contain about 200,000 cubic yards of earthwork. The gathering-ground from which the reservoir will obtain its supply, comprises the chief part of Bingley Moor, and extends for about two miles north of the reservoir; the natural area which would drain into the reservoir would amount to about 400 acres, but this is increased to about 700 acres by a conduit running eastward from one end of the embankment, which intercepts and conveys to the reservoir the waters of the West Spring Beck. The work is being carried forward by the local board, under the superintendence of their manager, Mr. Greenwood.

EDINBURGH AND DISTRICT WATER SUPPLY.

The following elaborate reports have just been made by Messrs. Hawksley, C.E., and Leslie, C.E., to the trustees appointed under the provisions of the Edinburgh and District Water-Works Act, 1869.

The questions submitted by the trustees to these engineers on the 10th of March last were—1. To Mr. Hawksley, to report on the unexhausted resources of the Glencorse Valley, and on the amount of good and wholesome water which may be derived from that source, and at what expense, including the necessary conduits and piping; and, further, to consider and report on the capabilities of the Pentland range as a source of water supply, its yield, and the expense, keeping fully in view all probable claims of compensation, and also the fact that the existing mains cannot carry much more water than the quantity discharged through them at present. 2. To Mr. Hawksley and Mr. Leslie, to examine and report on what is generally called the Moorfoot scheme, on the cost (including full compensation) of taking a larger or smaller quantity of water, and on the relative advantages and expense of bringing the water from this source to Edinburgh direct, or of supplying Leith, Portobello, Musselburgh, and Dalkeith, as a separate scheme.

On the first reference, Mr. Hawksley reports as follows:—

As a matter preliminary to the preparation of my report on the several subjects you have been pleased to submit to my professional consideration, it was necessary to determine the existing and probable future requirements of the population in respect of their daily supply of water.

The numerous and extensive experiences I have had in nearly all parts of the United Kingdom, as well as in many other countries, during an active life of forty years mainly devoted to the special purpose of supplying cities and towns with water on the principle of constant service at high pressure, have, I trust, qualified me to offer to you a reliable statement on this important question.

In well-managed water-works undertakings—*i.e.*, in water-works undertakings in which a due regard is paid to the proper character and good state of repair of the consumers fittings, and the prompt suppression of waste under a well-organized but nevertheless moderate and otherwise unobjectionable system of periodical inspection, and in which the statistics of the business are so systematically ascertained and recorded as to be beyond dispute, the following are the general facts:—

The quantities of water required per head of the population for the average daily consumption are—

1. For domestic consumption	8 to 12 gallons.
2. For closets and baths	3 to 6 gallons.
3. For extra domestic purposes and the ordinary trades and manufactures incident to an urban population .	2 to 5 gallons.
4. For street watering and other public purposes . . .	1 to 2 gallons.

Hence we find that in some towns the constant supply can be well maintained with a delivery of as little as 14 gallons per head, whilst in a few other towns the maximum of 25 gallons has been reached.

In the Edinburgh district the consumption of water under the third and fourth heads does not amount on the average of the year to nearly 7 gallons per head. The total consumption, therefore, ought not to amount to so much as 25 gallons per head; and I am very confident that by the use of the simple means which have been successfully resorted to in other similar cases, I could readily bring the consumption within this maximum limit, without imposing any restriction upon the use of the water or any considerable expense upon the consumers.

To remove all possible doubts, I will, however, increase the maximum limit of 25 gallons by another item—

5. Suppressible waste	5 gallons.

and for the purposes of this report I will assume (but without admitting it) that the inhabitants within the limits of the Edinburgh and District Water-Works require an average daily supply of 30 gallons.

I have ascertained that the Registrar-General of Scotland estimates the present numbers of the three communities of Edinburgh, Leith, and Portobello at an aggregate of 260,000. The present demand for water may, therefore, be assessed at $260{,}000 \times 30 = 7{,}800{,}000$ gallons per day on the average of the whole year, being less in winter and more in summer.

I have also ascertained as an actual fact that although the works established in the Glencorse Valley are capable of supplying in seasons of the most protracted drought upwards of three million gallons per day, yet that, consequent upon the excessive amount of compensation given to the streams and mills, the water available for the service of the public is reduced to little more than one million gallons (1,090,000) per day. Thus, then, the millowners receive two-thirds of the produce of the valley, whilst the public obtains only one-third of the produce of the valley. This is the exact converse of the usual and equitable principle of compensation now almost universally accepted by the committees of the Houses of Parliament.

The available yield of the springs and reservoirs on the northern and eastern slopes of the Pentlands is safely estimated at 5,400,000 gallons per day. The minimum supply to the towns is, therefore, in round numbers 6,500,000 gallons per day, and hence there is a present liability to a deficiency in dry years operating over a period of six months of 1,300,000 gallons per day, varying from about two million gallons in the hotter months to about half a million gallons in the colder months. In other than years of small rainfall there is, however, no deficiency, for the existing pipes can deliver nine million gallons per day, and excepting in such periods the existing sources of water produce that quantity. It is, however, for such periods that the competency of a well-devised water-work is always calculated; and accordingly in the following report all the computations are made on the supposition that an unfailing supply is to be afforded to the population by means of adequate reservoirs, not only during the months of greatest demand, but also during the periods when the yield of the springs and streams is the least.

It will be the duty of the trustees to determine the magnitude of the works to be made for the purpose of supplementing the supply by the amount of the present *deficiency*, and of providing for the wants of an additional population. This is a matter of some difficulty, for the rate at which the population of Edinburgh and its neighbourhood has augmented has been very variable. It is, however, very unlikely that the future increase will amount to more than one-fifth in every succeeding decade. Assuming the present population at 260,000 people, we have upon this supposition:—

In 1872	A population of	260,000
1882		312,000
1892		374,400
1902		449,280
1912		539,136

I do not think it is necessary to speculate upon, and still less to provide for and against events and circumstances which may never happen or arise until after a period of 40 years; and I am quite sure that to form even moderately correct conclusions with respect to the social conditions and physical requirements of a future generation is quite impossible, and that, were it not impossible, it is at the least needless, because a future generation will know and feel its own wants, and will be enabled to provide for them much more satisfactorily with all the then existing facts before them than the present generation can by a vague and necessarily erring anticipation. I am led to this conclusion by the knowledge that many of the best works of water supply made by myself and other hydraulic engineers 30 or 40 years ago, on what were then considered broad views and the best principles, are now antiquated and in some instances obsolete; and it is obvious that an undue outlay of money by the present generation for the benefit of a future generation will not only bear heavily upon the existing ratepayer, but involve also a positive waste of pecuniary resources, inasmuch as that the interest of the now unnecessary portion of the outlay would amount, in one generation, to much more than the capital which another generation would require to expend for its own accommodation. For these reasons I shall not, in the following report, make any suggestions which would be applicable to a period beyond 40 years, when the present population may, perhaps, though not very probably, become doubled in its numbers.

I have considered the questions implied in the remit under almost every differing aspect under which they can be viewed; and, in the absence of any clue to the intentions of the trustees, my considerations have resulted in seven projects of varying magnitudes and value, all which I have now alone, or in conjunction with Mr. Leslie, the honour to submit. The general results, so far as they are capable of being expressed in figures, are exhibited in a tabular form, and, so far as they have required a physical representation, are shown on the accompanying map. The whole of the sites and areas referred to have been inspected by myself for the purposes of this report, notwithstanding that I had previously been tolerably well acquainted with them.

At the present moment the markets for labour and materials are in the most disturbed state. There are no settled and certain prices upon which estimates of the cost of construction can be safely based; all we know is that the present prices are of an exaggerated and temporary character. That they are unmaintainable is certain, but the point to which they will again descend is problematical. I have therefore dealt with the estimates relating to reservoirs thus—I have accepted Mr. Leslie's prices of two years ago, which I am assured were ample and actual for works executed in Scotland, with an addition thereto of 25 per cent. To the working out of the principal articles at the prices so increased, I have added 20 per cent. (instead of the customary 10 per cent.), to cover the cost of items too small to be dealt with except by the aid of perfected designs and admeasurements, and to cover the contingencies and uncertainties of works to be made upon ground the interior formation of which cannot be explored, and the expense of designs and supervision. I have also dealt with the estimates relating to pipes and other metal works, by taking a mean value between the highest prices of the day and the prices of two years ago, and to these I have added 10 per cent. for contingencies. I have no doubt I have thus assumed prices beyond those which will obtain two years hence; but with respect to the soundness or otherwise of this opinion the trustees will exercise their own judgment.*

In arranging the annexed table, the results have been stated exactly as they arose. They have not been strained or varied in any way, nor have they been influenced by any preconceived opinions or ideas. In fact, the last thing done was to ascertain the comparative economy of each undertaking by the figures placed in the last two columns, and to arrive at these figures the following process was adopted:—

1. The capability of each undertaking was ascertained, and from this was deducted 7,800,000 gallons, being the requirement of the present population of 260,000. The remainder is the quantity applicable to the wants of an additional population. Between the present time and the time at which any new works to be sanctioned by Parliament can be brought into use the population will probably increase by 20,000. This additional number will require 600,000 gallons per day; and as the cost of the works of distribution for this additional quantity will be about £9000, this sum was added to the otherwise total cost before the division by 280,000 was performed.

2. The cost of distribution at the rate of £15,000 per million gallons of spare capability has also found its place in the ultimate cost to the ultimate population each scheme is capable of supplying. The last column therefore shows, with all the fidelity at present attainable, the amount of the burden which each individual of the ultimate population will probably have to sustain. The study of these columns I regard as of the utmost importance.

All the waters of the several schemes now submitted are practically of equal value for the supply of an urban population. They are all soft waters; indeed, softer than is necessary for the service of a community not extensively interested in manufactures requiring the use of a water free from those innocuous ingredients which are commonly held in solution by nine-tenths of the waters found on the earth's surface, nor do they in any practical sense differ in their chemical or sanitary properties. They are all, in fact, very similar, in these respects, to the well-known water of the Glencorse reservoir.

They are also very free from colour, although not entirely so, for no water collected from mountain sides more or less clothed with heather, and here and there covered with peaty or other vegetable matter, can be absolutely free from colour; but care has been taken in the selection and arrangement of the several projects to separate the naturally browner waters as far as possible from the whiter waters, and to appropriate those browner waters for the compensation of the streams and mills.

I am a decided advocate for the filtration of surface waters, particularly in the case of an important city of much refinement. The operation of filtration, when properly performed, not only diminishes the tint, if there be any, of vegetable colouring matter, but it also brings the duller surface water into the physical condition of the brightest springs. It removes, in fact, every trace of suspended matter, whether of animal, vegetable, or inorganic origin. In the estimates I have therefore provided for having this operation performed at Alnwick Hill, which Mr. Leslie and I concur in believing to be the best situation for this purpose and for the commencement of the supply.

If the water be filtered, it should be immediately placed in reservoirs or tanks from which light and heat are carefully excluded. As these reservoirs need not contain more than a single day's supply, I have included in the estimates the cost of constructing them of that magnitude.

The system of constant service is peculiar in this respect, that the water must be delivered not at the discretion of the supplier, but at the will of the consumer. Now, in all towns there are particular hours at which the population concur in the use of water. Generally the hours of the forenoon are those in which the largest quantity of water is consumed, and in some of these hours the consumption is at a rate double that of the average of the 24 hours. Hence provision must be made in the main conduits of the distributary system for this maximum demand. I have accordingly estimated the cost of conveying from Alnwick Hill to and delivering at Minto Street the requisite quantity of water, under the pressure necessary for the complete and unfailing service of the entire district.

Beyond Minto Street I have made no studies, because it does not seem competent to me to enter upon the discussion of the modern methods of distribution; but, as I have already stated, I have included in the table of results the probable expense of future extensions. I may, however, remark, that in the Bury Improvement Act, 1872, will be found the most perfect and the most useful code of rules and regulations relating to the distribution of water on the system of constant service and high pressure that has yet received the sanction of the Legislature. This code embodies the experience of many years, and is well guarded in the interests of the consumers. By the use of a nearly similar, but, in some respects, a less complete code, the Sheffield Water-Works Company has been enabled in two years to reduce the useless waste to the extent of 16 or 17 gallons per head per day. The supply at Sheffield is now absolutely constant, and at a pressure much exceeding that which obtains in Edinburgh,

* To prevent the possibility of future misunderstandings, I must remark that in the case of estimates to be made for the formal purposes of the Standing Orders of Parliament, those estimates must be made at current prices. Hence, any such formal estimates may differ from the estimates now submitted, although the actual facts may be consistent with them.

whilst the delivery, which had risen to nearly 40 gallons per head per day, and had become completely exhaustive of the means of the company, has now declined to 23 gallons per head per day. I could quote many similar instances of like results.

I have allowed to remain in my calculations an excess of 5 gallons per head per diem for suppressible waste, because I have doubted whether the trustees are quite convinced of the existence of waste to the extent I have mentioned, or, if convinced, whether they are at present fully prepared to adopt the measures necessary to its suppression. I will, however, venture to draw their attention to this important fact, that if it costs, say, £100,000 to bring a million gallons of water to the doors of the consumers, the monetary loss inflicted by the waste of only 5 gallons per head per diem is to the present population £130,000. Nor is the waste in any way even indirectly useful in a sanitary point of view, for, as it occurs by thousands of minutely dribbling streams, it does not, simply because it cannot, exercise any appreciable cleansing influence.

The tabulated results have been intended and are, I believe, sufficient for the purposes of the important discussions upon which the trustees are about to enter, and as these and the map give a condensed view of the entire subject, I shall abbreviate the merely descriptive part of this report as much as the comprehensive terms of the remit will justify.

It now only remains for me to state, with much deference, and under the anticipation that the trustees may, in the exercise of their wider knowledge and discretion, arrive at determinations different from my own, the conclusions to which I have been brought by a review of all the circumstances which have fallen within the scope of my professional inquiry:—

(*a.*) I am of opinion that the minor Moorfoot scheme (project No. 6 of the tabular results) offers on the whole the greatest advantages.

(*b.*) I am also of opinion that in any application to Parliament for that scheme power should be taken to enlage the scheme No. 6 to the magnitude of the major Moorfoot scheme (project No. 7 of the tabular results). It is now usual for Parliament to allow a term of 7, 10, or even 20 years in which to complete an extension of this character.

(*c.*) I am further of opinion that in any application to Parliament power should be taken to construct (at least) the Logan Burn reservoir and some catchwater channels, in order to diminish the now enormous escape of water from the Glencorse reservoir. For this, too, a considerable term of years will probably be allowed.

THE UNEXHAUSTED RESOURCES OF THE GLENCORSE VALLEY.

With regard to this member of the first branch of the remit, which is expressed in the following terms:—"To Mr. Hawksley, to report on the unexhausted resources of the Glencorse Valley, and on the amount of good and wholesome water which may be derived from that source, and at what expense, including the necessary conduits and piping"—I have the honour to state:

1. The rights and powers of the trustees with respect to the waters of the Glencorse Valley appear to be defined in the 85th section of the Edinburgh Water Company's Act. The language of this important section is as follows:—

§ 85. In order to make compensation to the owners of lands, mills, and other works on Logan Burn and the North Esk River for the right conferred on the company to stop, dam up, store, and use the whole waters thereof above the Crawley cistern, and for the damage they might sustain by the company being authorized to conduct the waters of the Black springs to the conduit leading from the cistern at Robinrig to the Clubbiedean reservoir, instead of to the Crawley cistern or fountain head, the company shall allow to flow through the gauge presently placed near the said Crawley cistern 40 cubic feet of water per minute during the six months of May, June, July, August, September, and October, and 20 cubic feet of water per minute during the other six months of November, December, January, February, March, and April, in addition to the quantity of water stipulated to flow through the said gauge by the Local Act 6th and 7th Vict., chap. 89, making the total quantity to flow through the said gauge at Crawley 220 cubic feet per minute for ever thereafter, as a full compensation for the right conferred on the company to stop, dam up, store, and use the whole of the waters draining by the Glencorse Burn and its tributaries above the said Crawley cistern; provided that, in the event of the said Glencorse reservoir and the said Loganlea reservoir proving inadequate to afford the quantities of water provided to the owners of lands, mills, and other works on the course of Logan Burn and North Esk River by the said Act of 6th and 7th Vict. and the first recited Act, the said owners, or any of them, shall be entitled to apply to the sheriff, who shall ordain, in terms of the Local Act 59th Geo. III., cap. 116, the said burn and Crawley spring to be turned into their original channel, and to continue to flow therein and through the aforesaid gauge for the use of the said lands and mills so long as a deficient supply shall continue to exist, and that in lieu of the aforesaid quantities of water provided as aforesaid to the said owners of lands, mills, and other works.

It is, therefore, clear that (subject only to the discharge for the use of the owners of lands, mills, and other works on the Logan Burn and North Esk River of the prescribed flow of 220 cubic feet of water per minute, so long as the same can be caused to flow through the gauge at Crawley, and in case of failure of ability to cause such prescribed quantity to flow through the said gauge, then for the time being of the natural flow only) the trustees are fully entitled "to stop, dam up, store, and use the whole of the waters draining by the Glencorse Burn and its tributaries above the said Crawley cistern."

The rights of the trustees in the waters of the Glencorse Valley therefore extend, after giving the stipulated amount of water compensation, to the residual produce of the rainfall of 3700 acres situated above the embankment of the Glencorse reservoir, plus the residual produce of the rainfall of the 810 acres which drain into the Glencorse Valley between such embankment and the Crawley cistern.

2. It has been well and authoritatively ascertained by Mr. Glaisher, F.R.S., and others, and I concur in their determination, that the collectable water of the area of 3700 acres is somewhat more than 20 inches on the annual average of a triennial period of minimum rainfall, and in like manner upwards of 18 inches on the lower area of 810 acres. The former estimation affords a daily average from the higher district of 1½ million gallons per 1000 acres, and from the lower district of 1⅛ million gallons per 1000 acres.

	Gals. per Day.
The higher district will therefore yield 3·700 × 1½ million. . .	4,625,000
The lower district ·810 × 1⅛ million	911,250
	5,536,250
From which deducting the compensation supply of 220 cubic feet per minute	1,973,664
There remains to be stopped, dammed up, stored, and used . . .	3,562,586

3. It is a well-ascertained fact that, to enable the stated amount of rainfall to be stored, regulated, and utilized for an urban supply, the impounding reservoirs must have a total capacity equal to a six months period of average daily demand. The reservoirs proper to the Glencorse Valley should therefore contain 5,536,250 × 182½ = 1010 million gallons; but the capacities of the existing reservoirs are only—

	Gallons.
1. Loganlea	122,000,000
2. Glencorse	366,500,000
Total	488,500,000
Leaving a deficiency of	521,500,000

Whence it follows that, although the natural capability of the Glencorse Valley is fully 3½ million gallons per day, even in dry years, and much more in ordinary and wet years, yet that, owing to the deficiency of storeage, the reservoirs become prematurely exhausted in years of drought, when the supply of water to the Edinburgh district from this source practically ceases till the flow of the streams again exceeds 220 cubic feet per minute, or 2 million gallons per day. The dearth of water which prevailed in Edinburgh during portions of the years 1870 and 1871 was indeed mainly attributable to this cause, and not to the defective power of the Glencorse Valley, for during the six months commencing in July, 1870, and terminating in January, 1871, the quantity of water sent through the Crawley pipe for the supply of the population averaged only 1,089,264 gallons per day, leaving the reservoirs at the end of that period wholly exhausted.

Project No. 1.

4. To correct this disproportion between the capabilities of the valley as deduced from the rainfall, and its capabilities as limited by the existing power of storeage, other reservoirs must be made to contain in the whole 521 million gallons, one of which ought to be placed in the glen above the Crawley cistern and the others in the valleys above the Glencorse reservoir. There are ample facilities for this purpose. Thus, one reservoir may be constructed on the Logan Burn to contain about 400 million gallons, and a second in the Glen to contain about 121 million gallons. But to enable the advantages of these reservoirs to be fully utilized, it would be necessary to construct some catchwater channels, and to lay an additional main-pipe from the Crawley cistern to the city, in aid of the existing main-pipe, the daily delivering power of which is only about 2½ million gallons.

5. As the other sources possessed by the trustees afford a supply amounting to nearly 5½ million gallons per day, the realization of the capabilities of the Glencorse Valley above the Crawley cistern would bring the total capability of the existing undertaking to about 9 million gallons per day in the driest seasons—being a supply at 25 gallons per head per day for 360,000 people, or at 30 gallons for 300,000 people.

6. The larger reservoir on the Logan Burn would require a depth of about 55 feet (Ordnance level of surface about 795 feet), and would cover with water about 50 acres. The smaller reservoir in the glen would require a depth of nearly 40 feet (Ordnance level of surface about 650 feet), and would cover with water perhaps 30 acres.

7. The probable cost of the now suggested works, including the value of land and other compensations, I estimate at the gross sum of £130,000.

8. Before quitting this branch of the subject, I think it right to mention, although by so doing I am departing somewhat from the precise terms of the remit, that the foregoing plan for dealing with the waters of the part of the Glencorse Valley above the Crawley cistern is, in my opinion, too limited, and also relatively too expensive; and that the scheme referred to in the remit may be considerably improved by the utilization of the entire watershed of the Glencorse Burn, above its junction with the North Esk River. Mr. Leslie, who had previously directed his attention to this matter, and who had planned a very eligible reservoir at Auchindinny, entirely concurs in this view. I shall, therefore, take the liberty to place before you the result of our joint computations.

Project No. 2.

9. By dealing with the entire valley an addition of 800 acres will be made to the watershed. The reliable productiveness of this lower district may be safely taken at 16 inches in depth of rain, or 1 million gallons per 1000 acres. Hence we may estimate the available daily quantity at 800,000 gallons, of which one-third must be discharged into the stream for the use of the mills, because this added watershed lies below the compensated area.

10. I find that by assigning a capacity of 490 million gallons to the Logan Burn reservoir, and 180 million gallons to the Auchindinny reservoir, the capabilities of the watersheds may be exactly satisfied, and that the Glen reservoir, the most difficult to construct and the most expensive in its character, can be dispensed with. The Logan Burn reservoir will then have a maximum depth of about 60 feet (Ordnance level of surface about 800 feet), and will cover with water about 60 acres. The Auchindinny reservoir will have a maximum depth of about 55 feet (Ordnance level of surface about 520 feet), and will cover with water about 32 acres. But to adjust the areas of the watersheds to the capacities of the reservoirs some short and inexpensive catchwater drains or carriers must be made.

11. By this project the Glencorse Valley would produce in years of great drought for the purposes of supply somewhat over four million gallons per diem, and augment the water compensation at Auchindinny from 220 cubic feet per minute to nearly 250 cubic feet per minute, besides ensuring its full delivery in all seasons. Between the Crawley cistern and the Auchindinny reservoir the compensation stream would remain unaltered, as would also the existing tunnel and filter-beds of the trust, which in the preceding scheme would become submerged by the construction of the Glen reservoir.

12. If this project be carried into execution, the quantity of water available in the driest years, for the daily supply of the communities, would become 4,100,000 + 5,400,000 = 9,500,000 gallons, a quantity sufficient for the service of 380,000 people with 25 gallons per head, or of 316,000 people with 30 gallons per head.

13. I estimate the expense of this project at the gross sum of £149,000.

Project No. 3.

14. Before proceeding to discuss the wider question, it is desirable to consider the effect of a partial appropriation of such of the available waters of the Pentland Range as are obtainable in the vicinity of the Glencorse Valley.

The natural capabilities of the entire valley have been alluded to in paragraphs 1 to 5, to which I beg to refer, but in the course of the examination of this portion of the district, it appeared to me that it is possible to increase its capabilities by throwing out catchwater drains on the east side to the Boghall Burn, and on the west side to the Loan Burn. By these means an addition to the watershed of 1688 acres will be made, and this area will afford the means of obtaining 1,400,000 gallons per day for the town supply, and 700,000 gallons per day for compensation to mills and streams.

15. Adding 1,400,000 gallons to the quantity (9,500,000 gallons) mentioned in paragraph 12, I find that by this project the town may acquire a dry season supply of 10,900,000 gallons per day, equivalent at 25 gallons per day to the constant service of 436,000 people, and at 30 gallons per head of more than 360,000 people.

16. To effect this object it is necessary to augment the storeage of the reservoirs of the Glencorse Valley by 385 million gallons, and this can be accomplished by constructing at Greenclench an additional reservoir of about 70 feet deep (Ordnance level about 940 feet) to contain 200 million gallons and cover an area of about 25 acres, and by increasing the depth of the proposed Logan Burn reservoir to about 70 feet (Ordnance level near 810 feet), and its water-covered area to about 80 acres.

17. The cost of this further enlarged project will be about £217,000.

THE CAPABILITIES OF THE PENTLAND RANGE.

With regard to this second member of the first branch of the remit to me, which is thus expressed: "And further to consider and report on the capacities of the Pentland range as a source of water supply, its yield and the expense, keeping fully in view all probable claims of compensation, and also the fact that the existing mains cannot carry much more water than the quantity discharged through them at present"—I have also the honour to state:

18. I have again examined the northern and eastern slopes of the Pentland

Hills, and have come to the conclusion that although certain quantities of uncoloured, or only slightly coloured waters, and a few insignificant springs, may still be collected for water supply, yet that on the whole the difficulties to be encountered and the expenses to be incurred for the utilization of these sources are of such magnitude as to render any endeavours in these directions very unadvisable. I have, therefore, discarded the northern and eastern slopes from my present considerations.

19. On the contrary, the southern slopes of the Pentlands above the level of objectionable cultivation, and with the exception of the upper part of the valley of the North Esk River, the streams flowing from which are highly coloured by peat, afford waters of an eligible kind, whilst on the course of the North Esk River and its tributaries, and in the Glencorse Valley, the means of obtaining suitable sites for reservoirs, of an adequate capacity for supply and compensation, present themselves.

20. Commencing at the western extremity of the watershed of the North Esk, we find on the Carlops and Fairlie Hope and Monks Burns 1938 acres; and on the Braidwood and Silver Burns 1269 acres; making a total area of 3207 acres, the whole of which is fit to be utilized for the public service, and is capable of adding 4 million gallons to the daily supply.

21. The requisite quantity of storeage can be found for the town supply, partly in the Windy Gowl, near Carlops, where, at comparatively little expense, a remarkably fine reservoir may be constructed, and partly on the Braidwood Burn; whilst, for compensation purposes, an extremely eligible site is presented in the valley of the North Esk, near Marfield. In the case of the reservoirs for the town supply, the natural drainage areas will be assisted by the catchwater channels shown on the annexed map.

The Windy Gowl reservoir will have a water surface of about 60 acres (Ordnance level about 998 feet), and with a maximum depth of about 62 or 63 feet will contain the required quantity of 441 million gallons, but at the Ordnance level of 1000 feet, and with a maximum depth of only 65 feet, it will contain 500 million gallons. As this reservoir is situated at the stormy end of the Pentlands, it may be desirable to construct it of the larger capacity.

The Braidwood reservoir has not been instrumentally surveyed, but judging from the enlarged Ordnance map, I am of opinion that the needed capacity of 290 million gallons can be obtained with from 40 to 50 acres of surface (Ordnance level about 960 feet), and with a maximum depth of about 60 feet.

The Marfield reservoir must have a capacity due to half the already stated area of 3207 acres, and must, therefore, contain 365 million gallons. The embankment may be placed across the valley, near the Marfield farmsteading. The probable depth of water is about 75 feet; the surface area will be about 54 acres, and the Ordnance level about 775 feet.

The catchwater channels will extend in an easterly direction from the Windy Gowl reservoir to the dividing line between the watersheds of the Silver Burn and the Loan Burn, and will intercept between their extremities all the waters descending from the southern flank of the hills, other than those which are conveyed to the reservoirs by the burns on which they are situated.

22. I am of opinion that the water thus obtained should be conveyed to Edinburgh by a distinct pipe following a distinct course from Carlops, by way of the higher side of Penicuick, to the Alnwick Hill service reservoir, or directly into Edinburgh, as the trustees may hereafter determine. Its diameter should be 18 inches, and its length will be nearly 14 miles.

23. The separate cost of this project (No. 5 on the tabulated results) is considerable, being about £307,000, or more than £76,000 per million gallons, inclusive, however, of the cost of filter-beds, service reservoir, and delivery at Minto Street. To the great length of the main-pipe, this comparatively larger but by no means exceptional cost is to be chiefly referred.

24. This project, combined with the last of the projects relating to the Glencorse Valley, would bring the dry season capability of the south side of the Pentland range to a total amount of 9½ million gallons per diem. This, with the utilized yield of the north and east slopes, would afford a total supply of 15 million gallons per diem; being 25 gallons per head for 600,000 people, or 30 gallons per head for 500,000 people.

25. The total cost of the utilization of the entire unused capabilities of the Pentland range (No. 4 of the tabulated results) would be about £530,000, and the cost per million gallons about £56,000. T. HAWKSLEY.

REPORT ON THE MOORFOOT SCHEME.

The following is the joint report by Messrs. Hawksley, C.E., and Leslie, C.E., on the resources of the Moorfoot district:—

With regard to the second branch of the remit, which is in the following terms:—"Also to Mr. Hawksley and Mr. Leslie, to examine and report on what is generally called the Moorfoot scheme; on the cost (including full compensation) of taking a larger or smaller quantity of water, and of the relative advantages and expense of bringing the water from this source to Edinburgh direct, or of supplying Leith, Musselburgh, and Dalkeith as a separate scheme"—

We, the engineers above named, jointly report as follows:—

1. That we have again examined the watersheds and sources of water and sites available for reservoirs within the area to which the term "Moorfoot Scheme" has been generally applied.

2. This scheme was devised by Mr. Leslie in the year 1866 for the improvement of the supply of water to the city of Edinburgh and the towns of Leith and Portobello. It embraces a district of mountainous and otherwise elevated land, situated upon and near to the north-western slope of the Moorfoot Hills and immediately on the confines of the counties of Edinburgh and Peebles. This district is drained by the head of the South Esk River, and by its tributary the Fullarton Burn, and comprises in the whole an area of 15,614 acres, of which 10,671 acres may become affected for water-works purposes in the manner hereinafter described. The watershed ascends from a level of 800 feet above the sea to a height of 2000 feet (equal in elevation to the peaks of the Pentland Hills), and the surface is for the most part in a natural condition, the proportion of cultivated land being but small, and the style of farming simple, and, as respects the proposed object, wholly unobjectionable. Some parts of the district are peaty, and yield water of a brown colour, but the larger portion is very clean, and yields water of a very pellucid character. The tinted waters can for the most part be easily separated, and may be used exclusively as compensation to the streams.

The rainfall of this district is at least as heavy as the rainfall on the Pentlands; we shall, therefore, adopt as its available value a yield of 1¼ million gallons per diem flowing from each 1000 acres (very nearly equivalent to a vertical depth of 20 inches per annum), as previously determined by Mr. Glaisher in the corresponding case of the Pentland range.

3. For the purposes of water supply, the district can be dealt with in two ways: (*a*) The scheme may be confined either permanently or in the first instance only to so much of the area as discharges its waters into the river Esk above Rosebery; or (*b*) the scheme may also include so much of the area as discharges its waters into the Fullarton Burn above Edgelaw. We shall consider the subject under both aspects.*

4. The project (*a*) comprises a total area of 7751 acres, capable of yielding 9,689,000 gallons per day, of which 3,230,000 gallons would be due as compensation to the river, leaving 6,459,000 gallons available for the towns. This latter quantity of water would afford a constant supply at the rate of 25 gallons per head per diem to a population of 258,000 people, or at the more wasteful rate of 30 gallons per head per diem to a population of 215,000 people, both being in addition to the existing resources of the trust.

For the purposes of this project, only two storeage reservoirs would be needed, and these reservoirs can be placed in unusually advantageous situations—the one for the service of the towns, and the other for the supply of the river. The former would receive the very pure stream called the Gladhouse Water, draining an area of 6131 acres, and the latter would receive the waters of the lower catchment basin containing an area of 1620 acres.

The Gladhouse reservoir, at a depth of about 61 feet (Ordnance level, say, 887), will be capable of retaining a store of water equal to 1396 million gallons, and the surface will then include 350 acres, or thereabouts.

The Rosebery reservoir, at a depth of about 82 feet (Ordnance level, say, 740), will contain 369 million gallons, being the quantity due to its own independent watershed, and will cover an area of nearly 50 acres.

The embankments of these reservoirs occupy narrow gorges, and are unusually short. We believe the total quantity of the earthworks above the surface will not exceed 300,000 cubic yards, and according to the superficial indications the puddle trenches will not involve any heavy or unusual operations.

5. The project (*b*) includes, in addition to the area of the watershed of project (*a*), the watershed and surface of Portmore Loch, comprising 610 acres, and the watershed of a portion of the Tweeddale Burn, comprising a further quantity of 1337 acres, making together an addition of 1947 acres. In respect of these 1947 acres, the waters of which are tributary to the Fullarton Burn, but would be diverted to the Gladhouse water, 973 other acres must be dealt with for compensation purposes by means of a reservoir to be made on the Fullarton Burn. Thus the project (*b*) will affect 10,671 acres, capable of yielding 13,344,000 gallons per day, of which 4,448,000 gallons would be due as compensation to the two streams, and 8,896,000 gallons would be available for the towns. This latter quantity would afford a daily supply of 25 gallons per head to a population of 355,840 people, and of 30 gallons per head to 296,533 people, both in addition to the capabilities of the existing water-works.

For the purposes of this enlarged project, the capacity of the Portmore Loch must be increased in order to enable it to regulate the available rainfall of its own shed. The capacity of the Gladhouse reservoir must also be increased to enable it to store the waters to be diverted from the Tweeddale Burn, and an additional reservoir must be made on the Fullarton Burn to afford compensation water to that stream.

By raising the level of Portmore Loch about 3 feet, and drawing off at a depth about 4 feet below the present outlet, its available capacity would be increased to 140 million gallons; and by increasing the depth of the Gladhouse reservoir to something less than 70 feet, its capacity would be increased by 305 million gallons; these being the augmentations of capacity due to the respective augmentations of the watersheds. The Gladhouse reservoir would then contain 1701 million gallons, and would probably cover with water about 380 acres.

On the Fullarton Burn an excellent situation for the formation of a reservoir is presented at the confluence of the streams near the farm of Edgelaw. To afford as compensation the amount of available water produced by the drainage of 973 acres, this reservoir must contain 222 million gallons, and this capacity can be obtained at the moderate depth of about 52 feet (Ordnance level, say, 702), and with a water-covered area of probably 50 acres.

6. Under either of these projects the supply for the towns will be derived directly from the Gladhouse Reservoir by a cast-iron main-pipe, the course of which would probably be by way, in part, of the Crawley Main to Alnwick Hill, where it might advisedly discharge into a service reservoir at a height of about 400 feet above the sea. If a very brilliant character of water be desired, the supply may be first taken to filter-beds, and thence to the service reservoir, from which it would be conveyed by an enlarged continuation of the main-pipes directly into Edinburgh for general distribution.

7. To complete the project (*a*), the main-pipes ought to be capable of conveying to the service reservoir about 5000 gallons per minute, and to complete the project (*b*) about 7000 gallons per minute. To provide against the effects of corrosion and roughening—effects which, notwithstanding all original precautions to the contrary, will eventually come into operation—in the former case the diameter ought not to be less than 21 inches, nor in the latter case than 24 inches.

It is important, however, to observe that in either case the water may, with economical and engineering advantages, be conveyed by two pipes rather than by one pipe. First, because since the entire capabilities of the district cannot be utilized for many years, it will be desirable to avoid for the time all unnecessary outlays of capital and the consequent burdens of taxation such unnecessary outlays would produce; and, second, because smaller pipes are safer and more manageable than larger pipes; whilst smaller pipes (ultimately) laid in duplicate would provide better against possible interruptions of supply by accident or otherwise, and at the same time greatly facilitate the necessary repairs. For the project (*a*) the proper diameter of the duplicate pipes would be about 16 inches, and for the project (*b*) about 18 inches.

8. The filter-beds for project (*a*) will be of ample size if they have ultimately an aggregate surface of 10,000 yards, and for project (*b*) if they have ultimately an aggregate surface of about 14,000 yards; but it is to be remarked that the filter-beds may be conveniently constructed in compartments of about 2500 superficial yards when and as the increments of demand may from time to time occur.

9. The service reservoir, which may also be made in sections, and should be vaulted and covered with earth for the exclusion of light and heat, need not contain a supply for more than one day's consumption, because any probable accident to the conduit-pipes can certainly be repaired within 24 hours. For project (*a*) the service reservoir need not contain more than 6¼ million gallons, nor for project (*b*) more than 9 million gallons.

10. From the service reservoir the conduit pipes for the supply of the communities must immediately proceed. In the forenoon the maximum draught is usually about twice as great as it is on an average of the whole period of 24 hours. Hence the delivering power of these pipes must be double that of the pipes by which the water is brought from the storeage reservoirs to the service reservoirs. Till the conditions of the future system of distribution (which is not within the scope of the remit to us) has been determined, it will be impossible to assign the exact diameters and several routes of these pipes. We include, however, in our estimates, the cost of 2 miles of conduit-pipes terminating in Minto Street, for project (*a*) of 30 inches diameter, and for project (*b*) of 36 inches diameter, subject to the observation that when the system of distribution is being re-arranged it may be found to be more advisable to lay down two smaller conduit-pipes rather than the single pipes of the large diameter now indicated.

11. We now beg to present our estimates of expense for the two projects comprehended in the Moorfoot scheme, but before so doing we desire to state expressly that in the present disturbed state of the markets for labour and materials, there are no settled prices upon which an engineer can safely base his computations. We have added 25 per centum to the cost of labour as it stood two years ago, and with respect to the cost of iron pipes we have adopted as a probable standard a mean value between the very low price of 1870 and the exaggerated and unmaintainable prices of the present hour.

From these data we estimate the expense of project (*a*) at the gross sum of £213,000, and of project (*b*) at the gross sum of £311,000, including in both cases, liberal allowances for the acquisition of land and for all probable compensations and contingencies. These estimates may, however, be largely reduced if the trustees should think fit to dispense with the extensive system of filter-beds and covered service reservoirs which we have introduced with the

* For project (*a*) see Tabulated Results No. 6, and for project (*b*) see Tabulated Results No. 7.

object of presenting the scheme in the most perfect form of which it is susceptible.

12. With regard to the Moorfoot scheme generally, we have now only to add, in compliance with the terms of the remit, that while we consider this project eminently well suited for the supply of the three municipalities included within the jurisdiction of the Edinburgh Water Trust, we conceive that no difficulties, but rather that some benefits, would result from affording a supply, either in bulk or in detail, to the towns of Dalkeith and Musselburgh, and, indeed, to any other places which can be conveniently reached by branches from and by the pressure within the main-pipes leading from the storeage reservoir to Alnwick Hill; but we are decidedly of opinion that the Moorfoot scheme is devised upon much too large a scale to make it available for the separate supply of these outlying populations, the probable requirements of which are not likely to reach to so much as the supply of half a million gallons per diem.

In connexion with this subject we may further observe, that in the event of the trustees accepting our opinions with regard to the duplication of smaller main-pipes, it may well happen that it will become advisable to give to each pipe the route which will enable it to supply the rural and minor urban populations to the most advantage and with the greatest facility.

13. In conclusion we have the honour to state, in compliance with the terms of the remit, that we are unable to discover any advantages which would result from bringing the waters of the Moorfoot district to Edinburgh direct (*i.e.*, for the exclusive use of Edinburgh); or for the purpose of supplying Leith, Portobello, Musselburgh, and Dalkeith as a separate scheme. The capabilities of the Moorfoot district are, on the one hand, greatly in excess of the requirements of the four minor towns; whilst, on the other hand, the works indicated on the map are perfectly eligible for the common supply of the populations within the jurisdiction of the trust, and also of the towns of Musselburgh and Dalkeith.

T. HAWKSLEY.
JAMES LESLIE.

In obedience to the second remit, expressed in the following terms:—"That the trustees, having considered the reports of Mr. Hawksley and Mr. Leslie on the Pentland and Moorfoot schemes, resolve to obtain a report from them on the Lyne"—

We, the engineers above named, jointly report as follows:—

1. That although we were well acquainted with that portion of the watershed of the river Lyne which in an engineering sense is capable of being appropriated for the supply of water to the city of Edinburgh and its neighbouring towns, we have recently made a special inspection of the same locality, with the view of being prepared, if so required, to make a report thereon.

2. This area includes the mountainous parts of the catchment basins lying northward and westward of the village of Linton. It comprises, above the 900 feet contour of the Ordnance maps, about 6548 acres of pastoral land. The water, though occasionally somewhat stained with vegetable colouring matter, is on the whole as good, and is as well suited for the supply of the communities, as are the surface waters of the Glencorse Valley.

3. The rivers Lyne and West Water have their rise in these basins, and are contributory to the river Tweed; consequently they are not within the watershed in which the district of the trust is situated. The elevations are, however, such that reservoirs of competent size can be constructed at heights sufficient to enable the water to be conveyed with little difficulty and at a small expense across the slight ridge which intervenes between the drainage areas of the Lyne and the North Esk.

4. Several years ago Mr. Leslie investigated this district, and planned three very eligible reservoirs, two on the river Lyne and one on the West Water.

	Gallons.
a. The West Water reservoir contains . . .	125,000,000
b. The Wakefield reservoir contains. . . .	787,000,000
c. The Lynedale reservoir contains	588,000,000
Total	1,500,000,000

5. Taking the available annual rainfall at 20 inches, this amount of storeage is fully equivalent to a six months stock, and is consequently well proportioned to the area of the watersheds.

6. The dry-season yield may be safely estimated at 8,185,000 gallons per day, from which deducting one-third as compensation to the streams, there remains for the towns 5,456,667 gallons per day.

7. This quantity, added to the existing minimum resources, would bring the total capability of the undertaking to 11,945,931 gallons per day—a quantity sufficient for the supply of 477,837 people with 25 gallons per head per day, and of 398,198 people with 30 gallons per head per day.

8. We estimate the cost of this project, including filter-beds and storeage reservoir at Alnwick Hill, and main-conduit-pipes of 18 inches diameter from the Wakefield reservoir to Alnwick Hill, and thence, of 26 inches diameter, to Minto Street, at the total sum of £268,047.

9. We have tabulated the results of our investigation of this project, and have incorporated them in the general table annexed to the reprint of our reports, for the purpose of enabling the trustees to compare them the more readily with the results of the seven other schemes to which our attention has been directed.

10. The scheme with which this project most nearly compares in respect of general capability is the minor Moorfoot scheme, No. 6 in the table. On referring to the column No. 16, it will be seen that the capital account of the trust, as it would probably stand four or five years hence, divided over a population of 280,000, will, in the case of the Moorfoot scheme, amount to £2 17s. per head; whilst in the case of the Lyne scheme it will amount to £3 0s. 10d. per head. Moreover, the Moorfoot scheme will provide about 1 million gallons per day more than the Lyne scheme.

11. Under these circumstances, and taking into consideration the well-known and almost insuperable disinclination of Parliament to grant powers for the acquisition of the feeders of rivers in which the populations to be supplied have no immediate interest, so long as other suitable waters can be obtained from the watershed in which such populations are located, we beg to submit to the trustees, whilst frankly admitting the suitability *per se* of this project, our distinct but deferential opinion that the Moorfoot scheme is on the whole to be preferred to the Lyne scheme.

12. In conclusion we beg to express our decided opinion that all the schemes upon which we have had the honour to report will furnish waters well adapted for the supply of the three communities; practically all the waters are of equal value, and in all their chemical and physical properties they will closely assimilate to the water of the Glencorse reservoir, except in this respect, that after being collected and averaged in large reservoirs, and after subsequently undergoing the process of slow filtration in filter-beds of the suggested magnitude and character, they will become, while still retaining their softness, as clear and nearly as pellucid as any ordinary spring water. We are the more desirous to offer this final remark because our experience has taught us that samples collected on particular occasions, not from considerable lakes or reservoirs, but from streams largely affected by the circumstances of seasons and weather, do not in general represent with adequate fidelity the actual condition of the supply to be obtained from the district through which such streams have their course.

T. HAWKSLEY.
JAMES LESLIE.

TABULAR RESULTS.

	Acreage of Catchment.	Total Capability in Gallons per Diem.	Deduction for Compensation.	Net Capability in Gallons per Diem for Supply in Dry Seasons.	Estimated Expense, including Conveyance to Alnwick Hill.	Estimated Expense of Land at Alnwick Hill, and of Filter-Beds and Service Reservoirs.	Estimated Expense of Conveying the Water from Alnwick Hill to Minto Street.	Total Estimated Cost of Additional Quantity delivered at Minto Street.	Total Estimated Cost of Additional Quantity per Million Gallons per Day delivered at Minto Street.	Total Capability of Undertaking, with 5,400,000 Gallons per Day added for the Existing Yield of the North side of the Pentlands.	Total Estimated Cost of the Undertaking, with the Addition of £575,000, being the Cost of the Existing Undertaking.	Total Estimated Cost of the Undertaking, with the Cost of Distribution added.*	Total Estimated Cost per Million Gallons per Day when distributed to the Ultimate Population.	Number of Inhabitants the entire Undertaking will be capable of Supplying.		First Charge per Head on 280,000 People.	Ultimate Charge per Head on Population supplied with Thirty Gallons per Head.
														With Twenty-five Gallons per Head per Diem.	With Thirty Gallons per Head per Diem.		
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
						A.—Unexhausted Resources of the Glencorse Valley.											
1. Existing Sources above Crawley Cistern .	4,510	5,536,250	1,973,664	3,562,586	£94,709	£27,312	£7,737	£129,758	£52,470	8,962,586	£704,758	£722,196	£80,575	358,503	298,752	£2 11 0	£2 8 4
2. No. 1, with 800 acres added between Crawley Cistern and Auchindinny .	5,310	6,836,250	2,240,330	4,095,920	108,450	31,286	9,620	149,356	49,669	9,495,920	724,356	749,795	78,958	379,836	316,530	2 12 4	2 7 4
						B.—Capabilities of the Pentland Range.											
3. No. 2, with 1688 acres added, by means of Catchwater Conduits extending to Bog Hall Burn and Loan Burn . .	6,998	8,436,250	2,940,380	5,495,920	163,551	£42,475	£11,854	£217,380	£49,326	10,895,920	792,380	838,819	76,984	435,836	363,197	2 17 6	2 6 2
4. No. 3, with 4810 acres added, by means of Drainage Areas and Catchwaters further extended to Carlops, and Compensation Reservoir at Marfield . .	11,808	14,448,750	4,944,496	9,504,254	432,223	73,797	22,708	528,728	55,626	14,904,254	1,103,728	1,210,806	81,196	596,197	496,822	3 19 6	2 8 8
5. Existing Sources *unaltered*, with Carlops and Braidwood Areas added, and Compensation Reservoir at Marfield . .	4,810	6,012,500	2,004,167	4,008,334	208,672	30,630	8,097	307,399	76,695	†10,497,592	882,399	922,863	87,908	419,904	349,920	3 3 8	2 12 9
						C.—Capabilities of the "Moorfoot Scheme."											
6. River South Esk, above Rosebery . .	7,751	9,689,000	3,230,000	6,459,000	143,900	£53,600	£15,754	£213,254	£83,016	†12,948,000	788,254	883,864	68,239	517,920	431,600	2 17 0	2 1 0
7. No. 6, with the addition of Portmore Loch and Tweeddale Burn, and proportionate part of Fullarton Burn . .	10,671	13,344,000	4,448,000	8,896,000	216,086	73,400	22,107	311,593	85,026	†15,385,000	886,593	1,018,458	66,198	615,400	512,833	3 4 0	1 19 9
						D.—Capabilities of the Lyne District.											
8. Rivers Lyne and West Water.	6,548	8,185,000	2,728,333	5,456,667	214,515	£42,178	£11,354	£268,047	£49,119	†11,945,931	843,047	905,235	75,777	477,837	398,198	3 0 10	2 5 6

* The cost of distribution is calculated at the rate of £15,000 per million gallons on the excess beyond the supply of 280,000 people with 30 gallons per head = 7,800,000 gallons per diem.

† These quantities include, in addition to 5,400,000 gallons per day from the north side of the Pentlands, 1,089,264 gallons, the existing daily yield from the Glencorse Valley during extreme drought.

The preceding reports were submitted to a meeting of the Works Committee of the Water Trust on the 19th ult., notice of motion was given by Councillor Mackenzie, countersigned by Councillor Wormald, to the effect that the trustees should approve generally of the reports; that it should be remitted to the law agents of the trust to consider what steps may be necessary with a view to parliamentary action in the ensuing session, and how the trustees can avail themselves of the provisions of Mr. Leman's bill, with power to take the opinion of counsel; that copies of the reports should be sent to the Town Councils of Edinburgh, Leith, and Portobello; and that those members of the trust who are town councillors should bring the matter before their constituents as soon as possible. At the Town Council meeting on the 8th inst., the resolution of the Water Trustees was submitted. Mr. Wormald proposed that the council should approve generally of the reports, and, subject to the approval of the ratepayers, of the expediency of the trustees taking action during the ensuing session for the purpose of attaining additional powers for checking waste and increasing the supply from the joint Moorfoot and Pentlands scheme; and request the representatives of the different wards to bring the subject before their constituents on an early day. An amendment was moved by Bailie Tawse to the effect that the reports should be remitted to the Lord Provost's committee, and also submitted to the consideration of the ratepayers. A vote being taken, the amendment was carried by 21 to 11 votes.

At a meeting of the trustees on the 10th inst., it was resolved, by a majority of 14 to 2 votes, to request Mr. Ayres to examine into the waste of water, and report as to the best means of preventing it. A letter was read from Mr. Dundas, of Arniston, intimating that the Moorfoot A scheme was so detrimental to that part of the country in which he resided, that he should be obliged to give it his most strenuous opposition. On the general question of an additional water supply, Bailie Miller moved—"That the trustees, having considered the reports of Mr. Hawksley and Mr. Leslie on the Pentland, Moorfoot, and Lyne schemes of water supply, approve generally thereof, and recommend for the consideration and approval of the ratepayers and owners the expediency of the trustees taking action in Parliament during the ensuing session for the promotion of a bill to obtain additional powers for checking waste, and of increasing the present water supply from the joint Pentland and Moorfoot schemes, as recommended by Mr. Hawksley and Mr. Leslie; and in respect of the proximity of the parliamentary session, remit to the Works Committee, with powers to take immediate proceedings under Mr. Leeman's Act to obtain the consent of the owners and ratepayers, and proceed with this scheme." Three amendments were proposed. The first was by Mr. Black, to the effect that the trustees, in consulting the ratepayers, should express an opinion favourable to a measure for checking waste and improving the distribution, and for bringing in a supply of 1,800,000 gallons from the Pentlands, at a cost of £107,000. It was moved by Mr. Wilson that the report regarding the Lyne scheme should remain under consideration, and that the engineers should be requested to report at what expense the Lyne water could be filtered at the reservoirs, and if a supply from that source could be introduced partially, at different periods; also, at what expense sufficient storeage accommodation could be obtained to keep the Glencorse pipe always running full. The St. Mary's Loch scheme was resuscitated by Bailie Steven, but found only two supporters, the bailie himself voting against it. Ultimately, the motion of Bailie Miller was carried by a majority.

DUTCH WATER-WORKS COMPANY, LIMITED.

The Statutory Meeting of the Shareholders was held on Monday, the 14th inst., at the London Tavern, Bishopsgate Street. The chair was occupied by Lieut.-Colonel TREVENEN HOLLAND, C.B. The notice calling the meeting was read by Mr. J. M. F. Hunt, the secretary.

The CHAIRMAN stated that such a short time had elapsed since the formation of the company, and that the delay in registering it as a "société anonyme" in Holland had been unavoidably so great, that he had but little progress to report, and very scanty information to give regarding the proceedings of the directors since the allotment of shares; such information, however, as he could give he would with the greatest pleasure afford, and he would with pleasure reply, as far as he was able, to any questions the shareholders present might desire to put to him. Since the allotment of shares, the directors had been taking the necessary steps to register the company in Holland as a "société anonyme," and in proving the quality and quantity of the water contained in the Duin lands. For this purpose, the managing director, Major-General Charles Scott, together with the company's solicitor, proceeded last July to the Hague, and settled the terms of the statutes with the Dutch commissaries or directors, whom they had some difficulty in persuading to forego advantages they claim for themselves. The managing director had further visited the site of the proposed canal, and, by desire of the directors, had inspected the water-works of the city of Amsterdam. This company's works would be commenced as soon as the company had been registered in Holland; and, within six months or a year from the time of their completion, he hoped that the shareholders might anticipate some profits from the undertaking. In regard to the registration of the company in Holland, the [company's solicitor at the Hague, Den Heer Blussé, had telegraphed the sanction of the Netherlands Government to the proposed alterations in the statutes; and the directors trusted that, in the course of a few days, their managing director and solicitor would, at Den Heer Blussé's invitation, proceed to effect the necessary registration at Middelburg. The managing director and solicitor were both present, and could give any further technical information required. It was the intention of the board to summon another meeting of the shareholders as soon as the registration of the company as a "société anonyme" had been accomplished, when further information on all matters would be given. Until, however, this registration had been completed, the board of directors considered it useless to apply for a settlement and quotation on the London Stock Exchange, and an unnecessary expense to issue share certificates, as fresh certificates would have to be issued on the registration of the company in Holland being completed.

Mr. F. B. ADAMS asked whether the quantity and quality had been proved.

Major-General SCOTT replied that, when in Holland, he went over the ground proposed to be traversed by the canal, and, to further satisfy himself and the board (by order of the latter), had instructed borings to be made in twelve different places, at the depth to which the canal was proposed to be carried, former attempts to ascertain the quality and quantity of the water having been confined to shallow excavations. He was happy to state to the shareholders that the water furnished by these borings was sweet and good, and perfectly adapted for the purposes for which it would be required.

In reply to a question by Mr. Thomas Barker, Major-General SCOTT further stated that the Amsterdam Water-Works had been in existence for twenty years, and that the water supplied by that company was drawn from the Duin land in the manner proposed to be adopted by the Dutch Water-Works Company; and this company's supply per head per day was intended to exceed by 4½ gallons the supply given to the inhabitants of Amsterdam.

The CHAIRMAN and the SOLICITOR having replied to several questions put by shareholders on matters of detail, Mr. THOMAS BARKER proposed, and Mr. CHARLES WHITFIELD seconded a vote of thanks to and confidence in the directors, which, after the full and complete explanation given by the chairman and managing director on all matters, he felt sure would be carried by the meeting.

This resolution, on being put, was carried unanimously.

The CHAIRMAN proposed, and Mr. F. B. ADAMS seconded, a resolution to the effect that Mr. Cooper (of the firm of Messrs. Johnstone, Cooper, Wintle, and Evans) and Mr. Whiffin (of 8, Old Jewry) be appointed auditors, which resolution was carried unanimously.

A vote of thanks to the chairman was also carried unanimously.

GASES ENCLOSED IN ENGLISH COAL.

By Dr. ERNST VON MEYER.

In this paper the author gives the results of the examination of the gases obtained from eight samples of coal from the Newcastle and Durham districts.

No. 1.—Low Main seam, from Bewicke Main Colliery (Newcastle district).
No. 2.—Maudlin seam, from Bewicke Main Colliery (Newcastle district).
No. 3.—Main coal seam, Urpeth Colliery, Newcastle (Durham district).
No. 4.—¾-seam, Urpeth Colliery, 30 fathoms from surface.
No. 5.—¾-seam, Wingate Grange Colliery, Durham district, 74 fathoms from surface.
No. 6.—Low main seam, Wingate Grange Colliery, 108 fathoms from surface.
No. 7.—Harvey seam, Wingate Grange Colliery, 148 fathoms from surface.
No. 8.—Harvey seam, Emily Vil., Woodhouse Close Colliery, 25 fathoms from surface; district not given.

From the following table it will be seen that no other hydrocarbon than marsh gas was found in any case :—

Number of Analysis.	District.	CO_2.	CH_4.	O.	N.	100 grams gave – c.c. gas.
1.	Newcastle	5·55	6·52	2·28	85·65	25·2
2.	„	8·54	26·54	2·95	61·97	30·7
3.	Newcastle—Durham	20·86	—	4·83	74·31	27·4
4.	„	16·51	trace	5·65	77·84	24·4
5.	Durham	0·34	85·8	trace	13·86	91·2
6.	„	1·15	84·04	0·19	14·62	238·0
7.	„	0·23	89·61	0·55	9·61	211·2
8.	Unknown	5·31	50·01	0·63	44·05	84·0

Taking the specific gravity of coal as 1·3, it will be seen that Nos. 6 and 7 contain nearly three times their volume of gases measured at ordinary pressures, and that therefore, as the coal is very hard and dense, the condensation of that gas must be very great.—*Journal of the Chemical Society.*

GASES ENCLOSED IN COAL.

By Dr. ERNST VON MEYER.

The gases actually enclosed in coal not having as yet been subjected to any thorough examination, the author, at the suggestion of Professor Kolbe, has undertaken a series of experiments to supply this deficiency, and thereby to throw some light on the natural history of coal.

The gases employed in this research were obtained from the coals by introducing two to four hundred grams of the latter into a flask, which was immediately filled up with hot de-aërated water, which was then boiled so as to expel the gases from the coal and drive them through a short straight tube, fitted by a caoutchouc plug to the mouth of the flask, into a number of tubes inverted in a basin of water supported on the end of the tube proceeding from the flask. The gases so collected were analyzed by Bunsen's methods; the data connected with the determinations so made are given in full in the original paper.

Coals from several districts were examined, both when freshly raised and after having been exposed to the influence of the weather for times varying from one to several years. The results obtained, though of great interest, may be very briefly summarized.

The majority of coals gave by this treatment gases agreeing in composition with those known to occur in ordinary mine gas—that is, carbonic acid, oxygen, nitrogen, and marsh gas.

The quantity of gas contained in various coals freshly raised and long weathered is shown by the following table (*mem*, the indication numbers attached to the name of the coal will be retained throughout the abstract to indicate the same sample) :—

	100 grams of Freshly raised.	Weathered.
(1.) Zwickau coal gave	38·0 c.c.	(*a*) 18·0 c.c.
(2.) „ „ „	25·5 „	(*a*) 18·6 „
(3.) „ „ „	54·8 „	(*a*) 13·6 „
(4.) Westphalian, from Essen	22·5 „	—
(5.) „ „ Bochum	50·6 „	(*a*) 43·2 „
(6.) „ „ „	54·4 „	(*a*) 39·2 „

The composition of these gases presents peculiarities in two cases only—viz., 1 (*a*) and 3 (*a*)—to which we will return, and which, it is to be observed, are both from coals altered by weathering.

The composition of the gases from fresh coal is shown by the following table :—

	CO_2.	O.	N.	CH_4.
1.	2·42	2·51	23·17	71·9
2.	4·02	0·62	50·36	45·00
2 (*a*).	2·25	0·7	23·89	73·16
3.	0·6	trace	48·0	51·4
4.	7·5	2·59	89·91	—
5.	4·87	2·66	75·82	16·65
5 (*a*).	11·12	2·88	78·6	7·4
6.	1·30	1·60	66·85	30·25
6 (*a*).	4·35	3·35	81·18	11·12

These numbers, selected from those given, show that exposure to the weather causes a loss of a great part of the marsh gas, as was to be expected, but the ratio of oxygen to nitrogen and carbonic acid also serves to show that in the process of the passage of vegetable remains into coal, the oxygen of the air concerned has gone mostly to the burning of the hydrogen, leaving the carbon comparatively intact.

The gas obtained from 1 (*a*) and 3 (*a*) was quite different in composition from that obtained from any other specimen. The figures of the analysis speak for themselves :

	CO_2.	O.	N.	CO.	CH_4.	C_2H_4.	Absorbed by fuming Sulphuric Acid.
1 (*a*)	16·7	4·9	55·15	..	3·17	18·61	1·47
Ditto, collected one week later	11·4	3·8	60·98	..	3·44	18·88	1·5
Ditto, collected two weeks later than the preceding	12·10	1·10	65·16	..	3·19	16·85	1·6
3 (*a*)	7·62	2·44	50·75	..	15·88	22·35	0·96
Ditto, collected one week later	10·10	2·6	50·53	1·82	10·18	25·32	1·45
Ditto, collected two months later than the preceding	11·18	2·82	67·99	..	..	16·36	1·65

The analytical data obtained (oxygen consumed, contraction, and carbonic acid formed) seemed to leave no doubt that hydride of ethyl was really a constituent of the gas obtained from these coals. The numbers given are in all respects satisfactory.

Three specimens of grey shaley coal, containing much pyrites, gave gases characterized by the absence of hydrocarbons and the preponderance of carbonic acid. As it is well known that coals which contain much pyrites oxidize

more readily than others, the formation of the product of the combustion of carbon can be explained in this case by the greater energy of the oxidizing action. The gases in this case had the composition shown—

	CO.	O.	N.
7.	48·7	1·8	49·5
8.	38·2	1·2	60·6
9.	54·9	1·2	43·9

Appendix.

Further experiments were made to determine whether exposure of a coal to a continued temperature of 50° C. caused an alteration resulting in further production of gas, or if the gases contained in it underwent any change of composition. The Zwickau coal, marked 1 (*a*) above, was taken for these experiments, because its gases had been repeatedly analyzed and found to present many points of interest.

The numbers formerly obtained for these gases were—

	CO_2.	O.	N.	C_2H_6.	CH_4.	Absorbed by fuming Sulphuric Acid.
(*a*) First collected gas . . .	16·7	4·9	55·15	18·61	3·17	1·47
(*b*) Gas taken a week later .	11·4	3·8	60·98	18·88	3·44	1·50
(*c*) Two weeks after *b* . . .	12·1	1·10	65·16	16·85	3·19	1·6

After the last of these analyses, the coal lay between three and four months in a cool dry place, when it was found to give off gas of the composition—

CO_2=12·91, O=2·57, N=57·8, C_2H_6=22·62, CH_4=4·06 per cent.

At the same time as this examination was made, another portion of the coal was kept for two days at 45° C., and then immediately treated in the usual manner, when it evolved gas as rapidly as the unwarmed portion. It was found to be free from marsh gas,

CO_2=10·65, O=3·2, N=74·72, C_2H_6=9·8, and absorbed by sulphuric acid 1·63 per cent.

By calculation it is shown that the heavy hydrocarbon is probably butylene.

It thus appears that, on warming, the whole of the marsh gas first escapes by reason of its greater diffusibility.

The gases from another coal from Zwickau were also examined both before and after heating the coal to 50° C. for twenty-four hours. The numbers given for the former include some error of the press, since the per centages given add up to 108. The hydrocarbons present were marsh gas, hydride of ethyl, and butylene. In the gas from the heated coal it seems to be shown that some high term of the marsh gas series, probably hydride of propyl, was present. The analytical numbers agree well with those required by—

CO_2=15·6, O=3·10, N=73·33, C_2H_6=4·39, C_4H_8=2·06, C_4H_{10}=1·75.

—*Journal of the Chemical Society.*

THE WATER-METER AND ITS USES.

[From *Van Nostrand's Engineering Magazine.*]

The subject of maintaining our water supply has for a long time been a matter of very general and serious interest to the city of New York, and has aroused considerable discussion as to the most judicious method to secure such a satisfactory result. Its importance for all general requirements, as well as for any extraordinary contingencies which may occur, such as an epidemic or a widespread conflagration, cannot be over-estimated. To attain this purpose the adoption of water-meters has been prominently urged by those who have given the matter the most thorough investigation. A popular prejudice, however, against their use, founded upon very erroneous grounds, has been incited by misrepresentations, coupled with an imaginary expectation of an advance upon the present tax for the use of the water. Experience and facts are so diametrically the opposite to such a supposition, that we have made a concise statement of indisputable data, by which it can be seen that the use of meters affords the only method whereby the community can be honestly and fairly served. That, instead of enhancing the individual cost, it will reduce it, unless grossly wasted, and, by equalizing it according to the amount used, materially increase the revenue, and entirely prevent the direful wasteage which now exists.

Meters for measuring water will be found an indispensable necessity wherever aqueduct water is used. The experience of the city of Boston (U.S.A.) may be aptly cited as furnishing a criterion for the guidance of other places, the subject there being no longer one of experiment or doubt. That city has in use a larger number of meters than any other in the Union. Aqueduct water was first introduced there in 1849; six years after, in 1855, the consumption averaged 10,346,300 gallons per day, and so rapidly increased that six years later (1861), it had reached a daily drain on the pipes of 18,189,304 gallons, an average of 102 gallons for each inhabitant, per day. The commissioners becoming alarmed, and convinced that the greatest portion of the water drawn was wasted, decided to attach meters in all places where much water was used, or where they suspected waste of it was permitted. Previous to which, that they might correctly ascertain the quantity of water necessary for the daily consumption of each person, they caused meters to be placed in their own dwellings, and found that 25 gallons a day was more than an ample supply for each person. The result fully justified their decision. As the meters were introduced the drain gradually and steadily decreased till, in 1866, it had fallen to 12,229,000 gallons per day, or to 58 gallons per inhabitant then, a falling off of 33 per cent. in the consumption, and gained 48 per cent. in the pressure. Had it increased only in proportion to the increase in the population (and the increase in the consumption of water is always considerably more) it would have been 21,577,062 gallons per day, or 76 per cent. more. In 1870, with a large increase of consumers, it had only reached a daily draught of 15,007,700 gallons, or less than 60 gallons per head.

As to the question of revenue. In 1861, with a daily consumption of 18,189,304 gallons of water, the revenue was 365,323.96 dols. In 1866, the consumption having fallen to 12,229,000 gallons, the revenue should (in like ratio) have fallen to 245,613.94 dols.; but, on the contrary, by the use of water-meters it increased to 486,538.25 dols.; and in 1870, had reached 708,783.68 dols.

The following comparison may justly be drawn:—Repeating the figures, Boston, without meters, in 1861, consumed daily 18,189,304 gallons, or $102\frac{28}{100}$ per head; income, 365,323.96 dols. With meters, in 1870, consumed daily 15,007,700 gallons, or $59\frac{86}{100}$ per head; income, 708,783.68 dols. Decrease in the consumption 3,181,604 gallons per day, equal to 17½ per cent. Increase in the receipts, 343,459.72 dols. per annum, equal to 94 per cent., besides 21 per cent. gain in the head, and all this in the face of 41 per cent.* increase of population. This extraordinary result was attained by the introduction of only 1108 water-meters, at the comparatively insignificant expense of 114,366.48 dols.

The Water Commissioners of that city, in their report of 1870, say: "The application of meters has been of great advantage to the city, both as regards the increase of income and checking waste, which is always liable in establishments where there are a large number of water fixtures."

The foregoing facts can be verified by reference to their reports of 1870 and 1871.

* Partly by extension of limits.

The Croton Aqueduct Board, of which the Hon. Myndert Van Schaick was president, were so impressed with the necessity of measuring the water, that in one of their reports to the Common Council, nearly twenty years ago, they stated that they would recommend the general adoption of meters as soon as an efficient one was invented, although it might perhaps cost the city a million of dollars for their introduction.

In a later report they say:

"No satisfactory estimate of the consumption of water at some of the manufactories and hotels can be made without the introduction of water-meters."

"Meters have been placed on 68* large buildings, and have operated beneficially in determining the quantity of water consumed. The board propose to extend the system in special cases of hotels, factories, &c., as circumstances may require."

And again, in another report—

"As stated in the last annual report, water-meters have increased in favour, and the consumer, who could not be convinced of the quantity of water used in his establishment, has now a certain and impartial umpire, and though the result in almost every case is against the consumer, yet the decision of this small, but very costly apparatus is generally acquiesced in."

In reference to preventing waste, Mr. Craven, then chief engineer of the Croton works, in a paper addressed to the *New York Evening Post*, March 17, 1868, declared that he had exhausted every means and argument in his power to prevent, or even mitigate, this inordinate waste, but without avail; and that he had finally been forced to the conclusion, that the only possible way in which it could be accomplished, was by attaching meters wherever aqueduct water was used, and that the benefit to the city would then be immediate and of vast importance.

Mr. Tracy, now chief engineer of the department, reports the daily consumption of water to be 88 million gallons, which shows that, with an increase of population in the last ten years of only 17 per cent., the drain on the water-works has increased 193 per cent.! besides considerable loss of head. It was 30 million gallons in 1860.

Although at the greatest outlay of money ever used for a like purpose, New York has now the largest supply of aqueduct water of any city in the world; the consumption being now, as stated, 88 million gallons, or $98\frac{34}{100}$ per head daily. Income in 1870, 1,178,341.34 dols. Should the Croton department receive remuneration for water in the same proportion as does the Boston Water-Works, the annual revenue would be 4,156,104.12 dols., but, for a lack of meters, New York loses annually now about 3 million dols., and yet the water-rates of New York are professedly about the same as in Boston. (*Vide* M. Hoffman's "Laws of City and County of New York," vol. i., folios 274 to 288.)

Compare now the distinctive policies of the two cities and their results.

Boston in the last decade, while it has increased in population 41 per cent., has decreased the consumption of water 17½ per cent., and in consequence gained in the head or pressure 21 per cent. So much better than ten years ago.

New York in the same period, with an increased population of only 17 per cent., has increased the consumption of water 193 per cent.! and lost in the head or pressure considerably. So much worse than ten years ago.

The reason is, Boston decided to control the waste, and by the aid of meters succeeded at a small cost. New York undertook to supply the waste without them, and after expending several millions has signally failed.

Professor Rankine, of Glasgow University, in an exhaustive work on the subject, estimates a liberal supply of water for cities thus: Domestic purposes, 15 gallons; commerce and manufactories, 7; washing streets, extinguishing fires, supplying fountains, &c., 3; waste under careful regulations, 2½; total, 27½ gallons per head a day.

In London the water is all measured (by meters and otherwise). By the census of 1871, the number of inhabitants was 3,383,002, and the water supply in that year 77,670,834 gallons per day, equal to $22\frac{95}{100}$ gallons per head daily, and yet there is no complaint made of a scarcity of water for any healthful or necessary purpose—domestic, industrial, or public.

The London figures prove that New York, with proper restraint of abuses, has sufficient supply of water for about four millions of people, and yet with less than one million of inhabitants, by permitting an illegitimate, unnecessary, and unpaid-for use of the greater quantity of it, by a small portion of the people, is drawing so close upon the resources that there is a constant fear of a disastrous water famine; and justly so, for, notwithstanding the enormous supply, the numerous poor have to go unwashed, the pestilential sewers and streets remain unflooded, the public fountains continue dry, and for a large conflagration the city is totally unprepared.

Every person who has considered this subject, and many expert engineers and others possessing large property subject to the risk of fires, have given it most profound study; all have come to the same conclusion, that the adoption of meters is the only possible remedy. In fact, when once adopted, the wonder will be why they were not used much earlier, the only ones to complain being even now habitual wasters or those not conversant with the subject.

It would be found at once that, while the majority of water takers do not use in their dwellings sufficient water to bring their tax up to the present rate—say about 15 dols. per annum—thousands of others designedly letting it run constantly day and night in their water-closets, use more than 1000 dols. worth of water, but pay only about 15 dols. like the rest, and no one except their immediate neighbours are the wiser for it, for no means are used to ascertain the fact. When once they found the cost they would soon moderate their extravagant hygienic notions. It is the opinion of many that the bulk of waste is in private dwellings, and not in the public and industrial establishments.

The wantonness of this waste can be fully appreciated when it is shown that to bring this amount of water to their premises, it costs the city about 500 dols. per annum (1 cent per 100 gallons, the interest alone on the cost of the works, 22½ million dols., being about half of this cent), this excess of cost (485 dols.) having to be paid in the general tax by those using only the 15 dols., and even by those deprived of it altogether, in consequence of this waste.

The other great source of wasteage is by subterraneous leakage through breaks in the conduit and pipes, and which secretly and imperceptibly finds its way into the sewers through underground fissures and crevices. These also are detected, and its location and importance promptly ascertained by the general use of meters.

A very great injustice is also done the poorest classes, who live principally on the upper floors of stores and tenement houses, for, by the loss of head or pressure in consequence of this waste, the water does not rise to their habitations, and they are, as a general thing, too tired of work to be carrying up water in buckets, in sufficient quantities for purposes of ablution and general cleanliness, and yet they really need it much more than the rich.

Out of the increased receipts (chiefly from delinquents), the meters pay for themselves invariably the first year, generally in six months, and often in three months. The second year they are sure to bring the consumption of water to one half, or even less, in proportion to the meters used, raising the head correspondingly, and all this without disturbing the great majority of consumers either in the quantity of water used or the amount they usually pay. In fact, a good many would pay actually less, besides having water in the upper stories.

In the annual report of the Board of Public Works of Chicago, of 1870 (which, after Boston and San Francisco, is using more water-meters), they say: "The board have found the use of meters, in establishments using large quantities of water, both satisfactory to consumers and profitable to the city." And in their report of 1871 they say: "The prejudice which formerly existed against the

* In operation now about 200 meters, being fewer than four years ago on a consumption of 62 million gallons.

use of meters is gradually giving place to a feeling of confidence in this method of determining the water assessment, and were it not for the heavy expense, the board would like to introduce them more generally than they have done heretofore."

Even continuing the present system of charges (according to the size of premises), meters would be invaluable; they would constitute a silent but positive corps of detectives, showing any wanton waste, thus enabling the authorities to enforce the fines imposed by law, which at present is impossible, as asserted by Mr. Craven. They would at once control the waste and raise the head, while the fines alone would in time pay the whole cost of their introduction. All the principal cities in the United States, and some in Europe, employ meters to some extent, England and Scotland largely; and the Governments of France and Belgium, in 1866, offered premiums for a reliable and cheap water-meter.

So satisfied was the Croton Aqueduct Department of the absolute necessity for the introduction of water-meters, as the only sure preventive of the excessive wasteage of the water, that in 1867 and again in 1870, they called by advertisement on engineers and inventors for a meter that they might recommend for general use, and a large number of them were tried on both occasions. The result of the first trial did not terminate in any final decision, but to the later trial a wider range was given. More extended public notice was then made, and in the meantime a powerful and thorough apparatus was constructed to test them. The trial extended over three months, day and night, and of the large number offered, 48 of all kinds (positive, proportionate, and inferential) were tested, and of them four of the positive class (three American and one Scotch) were selected as the best, finally resulting in subjecting these to a severer trial, which enabled the department to make a final selection of one of them. These trials and continuous experiments evince the decision made by these officials, that there was both a necessity for a more economical use of the water as well as that the introduction of the meters was the only feasible means of obtaining it.

It is the avowed opinion of the majority of Water Commissioners throughout the country that meters are a necessity, and that their general adoption is only a question of time; in fact, they are being now rapidly introduced. A good water-meter, however, is a very difficult instrument to produce, as is proved by the fact that during the last 15 years over 500 patents have been taken out in this country, and over 300 in England, and none as yet had been able to supersede the one invented by Mr. Worthington 18 years ago, and the only one used until lately in the United States.

The majority of these meters, no doubt, work, and even make a good show at a trial, and a considerable number give great satisfaction to their friends, but when put to a severer and protracted test they usually fail, or show signs of eventual failure from different causes, and not one in a hundred has proved a perfect practical success. A good reliable meter is a machine requiring such a rare combination of peculiarities that it is very difficult to attain. What makes a water-meter more difficult and much more costly than a gas-meter is the heavy irrepressible nature of water and its foreign matter, the high pressure, velocity, and ramming under which it has to work, and the extreme delicacy and sensitiveness required of such a heavy machine. Also the necessity of a perfect positive motion with nothing like a dead centre, a weak place, or a disposition to stop and refuse to start, and finally, its capacity to do the work totally uncared for and neglected. If on these points it be not absolutely infallible, it is useless to talk of other advantages. In conclusion, all these important qualities must be attained at a moderate cost, and this again has aggravated the difficulty.

No better evidence of these difficulties than the fact that, after so many years of incessant study and labour and the large amounts of money expended in experiments, &c., by able engineers, inventors, and others, in the production of over 800 patents, only three or four meters have ever been accepted and practically used, either here or in Europe.

To be more explicit, a first-class water-meter should possess, among others, the following essential points of excellence:—

1. It should be of positive motion, simple in construction, strong in form, and free of all springs, both metallic or rubber, or any bob weight to act as their equivalent.
2. Should accurately measure equally well under light or heavy pressure, either a small or large stream.
3. Should require the least possible amount of power to drive it, thus avoiding reducing or losing the head or force of the water.
4. Should not be liable to injury or obstruction from sediment or dirt.
5. Should throw a continuous, smooth, and even stream.
6. Should shed the greatest possible quantity of water in a given time, in proportion to its size and weight.
7. Should not cramp the water within itself, but allow it a free, easy flow, thus avoiding as much as possible any strain or throbbing in the meter or pipes.
8. Should be of incorrosive material, avoiding if possible two distinct metals in order to escape galvanic action.
9. Should have a register of positive motion, without ratchets or springs, so plain that consumers could read for themselves, and full enough to run a whole year at full speed, without going round, thus saving people from more than an annual visit from the inspectors.

In conclusion, this matter is one which appeals to the interest of every citizen. It is unnecessary to detail the privations arising from a water famine, or the dangers which even a reduced and low standard of pressure may cause, because these are self-evident. The remedy is the point at issue, and we think when the subject is fully and fairly investigated, it will be apparent to all that the use of meters guarantees the only entire security for a proper and efficient supply from our Croton resources.

LINCOLN GAS COMPANY.—At the half-yearly meeting of the shareholders in this company on Wednesday, Oct. 9, the usual dividend of £5 per share for the half year was declared, and the directors were re-elected. No increase in the price of gas will take place at present.

BRIGHTON GAS SUPPLY.—The corporation gas analyst, in his usual monthly report to the Gas Committee, remarks that "the gas from both companies is sustained by the average of observations above the standard of 14 candles; the impurities are small in each case, notably in that of the Black Rock Company."

VENTNOR (ISLE OF WIGHT) GAS SUPPLY.—At the meeting of the local board, on Monday, the 7th inst., the Lighting Committee were authorized to enter into negotiations with the gas and water company for the sale of their undertakings to the town.

THE GREAT ROBBERY AT CORK.—William Collins, the late accountant of the Cork Gas Company, who absconded with nearly £4000 belonging to the company, was arrested about a week ago in Geneva, and it is said the whole of the missing property was recovered.

PERTH OLD GAS COMPANY.—A meeting of the directors of this company was held on the 8th inst., when a final dividend was declared—viz., 2s. 8½d. on A shares, and 6½d. on B shares. A vote of thanks was passed to Mr. George Gray for the manner in which he had discharged the duties of secretary. The company was then formally dissolved.

GLYCERINE IN GAS-METERS.—In Dresden, glycerine is generally used in place of water; after it has been so used for some years, it becomes foul and requires purification. The fluid is first heated for 12 hours to from 50° to 60°, and next to from 150° to 180° in order to eliminate water, ammoniacal compounds, and other volatile impurities; the glycerine is next filtered through granulated animal charcoal. Some 300 to 400 cwts. of glycerine are annually purified in this manner at Dresden.—*Hasse.*

LOUTH GAS COMPANY.—The annual meeting of the shareholders was held on the 3rd inst., at the town-hall—Mr. C. Bowmar in the chair. A dividend of 10 per cent. was declared, and the works reported to be in a satisfactory state. The proprietors very liberally advanced the manager's and collector's salaries on account of the efficient way in which their respective duties had been performed, and after the appointment of the auditor and the committee, the meeting broke up.

HALIFAX (CORPORATION) GAS-WORKS.—It was decided some time ago to utilize the existing site of the gas-works instead of transferring the operations elsewhere, and under these circumstances it has now being determined to construct a siding from the Ovenden Railway, and likewise to erect additional coal-sheds and other appliances. The cost of these improvements is estimated at £8000. At a meeting of the Gas Committee, on the 4th inst., Mr. Fraser, the engineer, was instructed to prepare the necessary specifications and bills of quantities, with the view of letting the works by tender. It is intended that this branch siding should be pushed forward without delay.

KINROSS GAS COMPANY.—A special general meeting of the shareholders of the Kinross and Milnathort Gaslight Company was held in the town-hall yesterday afternoon—Mr. J. W. Williamson in the chair. After some discussion it was resolved to raise the price of gas from 7s. 6d. to 8s. 4d. per 1000 cubic feet, and to commence as at the 1st of October current. It was also agreed to that no discount be allowed to consumers above £5, as formerly; that no shareholder shall be entitled to hold more than four proxies; and to alter the provisions of the contract, so as to allow any shareholder to hold 50 shares of the capital stock of the company instead of 20, as at present.

MONITOR DIAL FOR GAS-METERS.—An invention has been patented under the above title, by Mr. Lacey, a former officer of the Chartered Gas Company. It consists in attaching to gas-meters an additional index or monitor dial, by which the meter can be so regulated as to supply any given quantity of gas, and then by its own action stop all further motion. In his prospectus, the inventor points out several ways in which the monitor dial can be applied to the advantage both of companies and consumers, and probably to persons practically acquainted with the distribution of gas, other ways in which it may be turned to good account will readily suggest themselves.

THE INSTITUTION OF CIVIL ENGINEERS.—Mr. Thomas Howard, of the King and Queen Iron-Works, Rotherhithe, who was for 37 years an associate of this society, has bequeathed to it the sum of £500, free of legacy duty, which sum he has by will directed "to be invested, and the interest thereof to be applied in such manner and under such conditions and instructions as the council of the said institution may think most expedient, for the purpose of presenting periodically a prize or medal to the author of a treatise on any of the uses or properties of iron, or to the inventor of some new and valuable process relating thereto, such author or inventor being a member, graduate, or associate of the said institution."

GAS EXPLOSION AT GLASGOW.—On Saturday evening, Oct. 5, a young man entered a public-house at the west-end, and proceeded downstairs to one of the rooms, with the view of having some refreshment. Finding the room in darkness, he struck a light, but had scarcely done so when a loud explosion took place, and he found himself lying on his back, very much singed and otherwise injured. The noise excited considerable alarm in the shop, and on examination it was found that the gas-pipe had been broken across and severed. The accident is supposed to have been caused by the mischievous conduct of a person who, on account of his intoxication, had been refused a supply of liquor in the shop shortly before the explosion, and who had gone downstairs, where he remained a few minutes, before leaving the premises.

STRIKE AT ARBROATH GAS-WORKS.—Six of the eight stokers employed at the gas-works in the end of last week gave notice to the corporation that unless their demand for an increase of wages—which demand had been only partially complied with—was granted, they would leave their employment on Friday, which would have had the effect of placing the town in darkness. The committee lost no time in dealing with the matter, and advertised for other men. No fewer than 21 applications were lodged; but in the interim, foreseeing that their places would be filled by others, the old men withdrew their threat, and offered to continue at their work. The commissioners met on Saturday to consider the matter, and resolved to dispense with the services of two of the old hands (whom they supposed to be the ringleaders of the movement), and to continue the remainder in their present position on proper explanations.

EXPORT OF COAL.—The export of coal from the United Kingdom (including coke and manufactured fuel) in the first three quarters of the year 1872 reached the large amount of 10,097,523 tons, of the value of £7,208,767. In the corresponding period of 1871, the quantity was only 9,358,730 tons, or less than in the present year by 738,793 tons; and the value of the export was only £4,489,962, or less by £2,718,805. The export of September, 1872, is valued at about 21s. per ton. In the first three quarters of 1872, 1,657,441 tons of coal have been exported to France, 1,652,420 tons to Germany, 722,330 tons to Italy, 720,230 tons to Russia, 524,593 tons to Denmark, 484,007 tons to Spain and the Canaries, 408,329 tons to Sweden, 361,259 tons to British India, 358,675 tons to Holland, 209,371 tons to Brazil, and 2,998,868 tons to other countries. Seven years ago the entire year's export of coal did not reach 10,000,000 tons.

BENZOIC ACID IN GAS LIQUOR.—According to Reinsch, on treating gas liquor with sulphate of lime at a temperature of 50° C., the carbonate of ammonia in the liquor is completely decomposed, with evolution of carbonic acid and formation of a yellowish solution of sulphate of ammonia, smelling strongly of tar. The tarry constituents are not easily separated from the salts of ammonia. If, however, the solution is dried at a moderate heat till no more aqueous vapours are given off, and the residue is then heated in a porcelain capsule covered over with a plate of mica, the mass assumes first a rose colour, then a purple red, whilst the mica is coated over with benzoic acid in shining crystalline needles. Over this crust is a tender, woolly sublimate, consisting of sal ammoniac and sulphate of ammonia. If the residue is treated with water and filtered, we obtain a colourless solution of sulphate of ammonia, and on the filter remains an aniline brown colouring body.—*Scientific American.*

DUMFRIES GAS SUPPLY.—On Tuesday evening last, a public meeting was held in the town-hall, Dumfries, at the instance of the Police Commission, to consider the supply, consumption, and price of gas in the town. Bailie Scott occupied the chair. Mr. Wood moved—"That this meeting is strongly of opinion that the interests of large communities are best served by the manufacture and supply of gas being conducted by corporate bodies for the public benefit." The motion was agreed to. Mr. Montgomery moved—"That this meeting generally approves of the steps taken with a view to the acquisition by the corporation of the works of the gas company." This was also agreed to. Mr. Dickson moved—"That in any bill to be promoted by the Police Commission no power to increase the rating of the people should be included." On the assurance being given that a motion would be made to transfer the question from the Police Commission to the Town Council, in which case no rating clause would be required, Mr. M'Gowan withdrew his motion.

THE PROPOSED PURCHASE OF GAS-WORKS AT DEWSBURY.—A meeting of ratepayers was held on the 4th inst., at the borough offices, Dewsbury, to take into consideration the scheme of the corporation for the purchase, along with Batley, of the works, &c., of the Dewsbury and Batley Gas Company. The mayor was elected to preside. A formal resolution, approving of the action of

the corporation, and sanctioning the payment of the costs incurred in any application to Parliament, was read by the mayor, and passed unanimously. A meeting of ratepayers of the borough of Batley was also held the same evening in the public hall, for the purpose of approving or disapproving of the corporation applying to Parliament for a bill to enable them to construct gas-works, and for power to purchase, in conjunction with the Corporation of Dewsbury, the works and plant of the Dewsbury and Batley Gas Company. A resolution to that effect was moved by Alderman S. Jubb, seconded by Councillor Talbot, and supported by several of the ratepayers, after which it was carried without a single dissentient. A vote of thanks to the mayor for presiding concluded the proceedings.

CARLISLE GAS-WORKS.—The new gasholder erected at these works is finally completed, and is now in use. It is a telescopic holder, and is erected in the same tank in which a single gasholder was erected in 1852, and which has now been replaced by the present one in consequence of the increased consumption of gas. The new gasholder is 83 feet in diameter by 46 feet in height, its cubical capacity being about 250,000 feet, or double that of the former holder. Special means have been taken to secure the safety of the holder by the use of diagonal rods between the columns; and these at the point of intersection have an ornamental star, in the centre of one of which the following inscription has been placed:—"Carlisle Corporation Gas-Works. John Irving, Esq., mayor, chairman of Gas Committee; Caleb Hodgson, Esq., vice-chairman; J. Hepworth, engineer, 1872." The gasholder has been erected at the cost of about £3000 by Mr. Daniel Howard (late B. Whitehouse and Co.), West Bromwich, from specifications prepared by Mr. J. Hepworth, manager of the works, and is a well-proportioned, substantial, and handsome structure. Its erection has happily been completed without the slightest accident to any one engaged in it.

NARROW ESCAPE FROM DEATH BY SUFFOCATION BY GAS IN LEEDS.—Some time ago we had to record a sad accident to a family in Leeds through the escape of gas from a service-pipe into a dwelling-house, by which two or three persons lost their lives. A similar accident occurred last Friday morning but fortunately without a fatal termination. Mr. George Spencer resides at 56, Cobourg Street, Leeds, and, as far as he and the remainder of his family knew, they left the house and gas perfectly safe when they retired to rest. When Miss Spencer awoke next morning, however, she experienced a suffocating sensation. With difficulty she arose and went to a neighbour's house. The cause of her indisposition was thus ascertained, and an alarm was at once felt for the safety of her father and mother, who were still in the house. On proceeding to their bed-room, Miss Spencer found that her father was so powerfully affected by the noxious gas that he could not stand. Restoratives being at hand, he recovered sufficiently to leave the house. Mrs. Spencer was more seriously affected, and had to be carried to the neighbour's house. Medical advice was sent for, and during the day the sufferers had well-nigh recovered. The gas, it seemed, had escaped during the whole of the night, and pervaded Mr. Spencer's residence. The leakage had occurred by the breaking in two of the service-pipe, from which the gas passed through the soil into the cellar kitchen.

DUNDEE GAS COMMISSION.—The monthly meeting of the commission was held on Wednesday, Oct. 2—Mr. John Moir in the chair. The following resolutions of the Finance Committee were approved:—"That £500 a year should be taken out of revenue and put to a contingent account to be applied in terms of the Act; that purifiers and other apparatus connected therewith, so far as extensions of existing power are concerned, should be charged to capital; that readjustment of old purifiers and other apparatus be charged to revenue; and that all ordinary repairs, as well as the cost of replacing destroyed meters, should be charged to revenue, and with the exception of new meters supplied to replace destroyed meters, all new meters, whether made at the gas-works or purchased, should be charged to capital." The meeting agreed to accept Messrs. A. and K. Macdonald's tender of £4300 for the construction of a new tank, and directed the clerk accordingly. The manager reported, regarding the supply of gas to Downfield, that the cost of the piping would be £429 19s. 4d. The consumption of gas during the first year was estimated at 280,000 cubic feet. He proposed that the cost above the Dundee price should, in the first instance, be 2s. 6d. per 1000, and when the consumption reached 400,000 feet it could be reduced to 1s. 9d.; when 500,000, 1s. 5d.; when 600,000, 1s. 2d.; and when 700,000, at which it must remain, 1s. per 1000 cubic feet.

OLDHAM (CORPORATION) GAS-WORKS.—At the meeting of the Gas and Water Committee, on the 3rd inst., the manager, Mr. Taylor, presented his annual return of the manufacture and consumption of gas, revenue, &c., which was ordered to be printed in the usual tabulated form. Mr. Taylor's summary report stated that the quantity of gas delivered during the year from the different station works had been:—Oldham, 127,003,000 cubic feet; Higginshaw, 102,162,000; Hollinwood, 122,187,000; Royton, 18,833,000; being a total of 370,185,000 cubic feet, against 345,607,000 in the preceding year, or an increase of 7·11 per cent.; and the quantity of cannel and coal carbonized in its manufacture had been 37,922 tons 12 cwts., being an increase for the year of 2738 tons 10½ cwt. The loss from leakage and condensation during the year had been 36,162,300 cubic feet, against 49,259,626 in the previous year, or 9769 per cent., against 14,253 per cent. of the quantity delivered. The maximum quantity of gas delivered in 24 hours was 2,567,000 cubic feet, on Dec. 20, 1871, and the greatest production, 2,383,000 cubic feet. During the past year, 1426 new gas-meters had been fixed, and 1341 consumers added. The total number of meters now in use was 21,282, and the present number of consumers, 20,808. The profits of the gas and water works earned during the year amounted to £43,756 17s. 9d., and, after paying the annuitants, the interest on mortgages, and £8356 in liquidation of the mortgage debt, there remained a net balance of £17,584 5s. 2d. A question arose as to handing over the residue of profits to the borough fund, but in view of discontinuing the Shaw Gas-Works, it was decided to leave the subject over for future consideration.

FATAL GAS ACCIDENT IN LONDON.—A sad accident occurred last Saturday evening in Mile End, where some new pipes are being laid for the Commercial Gas Company by Messrs. Aird and Sons, the contractors. In carrying the pipes across the Mile End Road, to avoid causing an interruption to the traffic a tunnel was formed beneath the roadway, with an opening at either end. The pipes having been laid on Saturday, one opening was filled in and one left for the continuance of the works in the ordinary manner above ground. After the men had ceased work, and at about seven o'clock in the evening, the watchman on duty observed that gas was issuing from the opening in large quantities, and, fearing an accident, at once communicated with some of the workmen who happened to be in a public-house close by. These men, three in number, procured some clay, and went beneath the roadway intending to stop the further escape. After they had been down a few minutes the watchman called to them, but, receiving no reply, he became alarmed and sent for assistance. This was soon forthcoming from the gas-works, which are close at hand, and after some delay, owing to the extensive escape of gas, which overpowered several men, two of those under the roadway were dragged out unconscious. Greater difficulty was experienced in getting at the other poor fellow, who was further under the road, and had got jammed between the earth and the gas-pipe. He was at length brought out by means of boat-hooks, but was dead. The other two men recovered during the course of the evening, and are now progressing satisfactorily. The name of the deceased man is William Press, and he has left a wife and three children.

NEWPORT (NEAR DUNDEE) GAS COMPANY.—At the meeting of this company, on the 5th inst., the report of the directors stated that the total revenue for the year was £995 11s. 8d., being £123 2s. 2d. more than the previous twelve months; that the expenditure was £669 5s. 9d., being £47 5s. higher; and that the balance of profits was £326 5s. 11d., being £75 17s. 2d. in excess. It was explained that the increased expenditure was in consequence of necessary outlays on the works, the expense attending the supply of gas to and lighting the public lamps and the clock in the tower of St. Thomas's Church last winter, and the rise in the price of certain kinds of gas coal used at the works; that, adding to the profit of the year £52 1s. 9d., the balance of the previous year's profits directed to be carried forward, and £4 7s. 8d. of last year's arrears recovered, left the sum of £374 0s. 5d. for disposal, and which sum the directors recommended should be applied as follows:—£100 19s., being 2½ per cent. on £4038 14s. 4d., the cost of the works, for depreciation of the permanent plant; £162 7s. 2d. for a dividend of 5½ per cent. to the shareholders; and £110 14s. 3d. to be carried forward to the current year's account. In consequence of the continued higher price of all the kinds of coal and other materials used at the works, the directors had been under the necessity of raising the price of the gas. A resolution, recommended by the directors in their report, was proposed and passed unanimously, further augmenting the capital stock of the company by the sum of £1000, to be allocated at £1 per share amongst all the shareholders, irrespective of their being holders of original or new stock, in proportion to the shares held by them; and increasing the limit of the holding of any partner in the capital stock of the company from 100 to 300 shares.

METROPOLIS GAS SUPPLY.—At the meeting of the Paddington Vestry on Tuesday, Oct. 15, the Highways Committee made a report recommending that the clerk forward to the Imperial Gas Company a copy of the police register of the state of the public lamps in the parish from the 11th of Sept. to the 7th inst., with an intimation that the vestry will expect an allowance to be made in the next lighting account in respect of the numerous lamps not lighted at night; also that the vestry must insist upon more attention being paid to the lighting of the parish. It appears that some time since the question of the price paid for lighting the public lamps was raised in the vestry, and the example of Uxbridge and Barnet quoted as showing a principle to be adopted in preference to that which obtains in London. A reference was accordingly moved to a committee, consisting of the churchwardens, overseers, and the chairman of the Highways Committee. Their report was now read to the vestry. Taking first the town of Barnet, the committee stated that they were there informed that the new process introduced by the Patent Gas Company was in use at the works at East Barnet, and had increased the illuminating power of the gas to 25 candles, and that little sulphur was found in the gas. The committee would not, however, express any opinion upon the merits of the scheme. The cost per lamp under the new process, including maintenance, was £5 5s. per annum, and the illuminating power of the gas appeared better than that supplied to this parish. At Uxbridge the committee found one meter used for every nine lamps, which effected a considerable saving in the cost of the gas. The annual cost prior to the introduction of the meter system, including lighting and repairs, having been £4 13s. 8d., while it now averaged £2 11s. 1d., and were the lamps lighted as in Paddington, all the year round, the cost would be £2 17s. 1d. per lamp. In spite of this difference the gas cost 5s. per 1000 cubic feet at Uxbridge, as against 3s. 8d. only in Paddington. On the motion of Mr. Ellis, the report was ordered to be printed.

LIMERICK CORPORATION GAS-WORKS.—At the last meeting of the Town Council of Limerick, Mr. Hall, according to notice, put certain questions to Mr. Otty, manager of the Corporation Gas-Works, touching the statement which had been made, that members of the corporation and members of the Gas Committee are in the habit of receiving coal from the Gas Committee at the contract price of same, in contravention of the resolution of council and minutes of the Gas Committee, that such a practice, admitted to be a wrong one, would be discontinued. Mr. Otty said that members of the Gas Committee and of the council received coals from the contractors, not from the gas-works. The orders were partly given by himself, and it was during the delivery of the coals from the ships to the works that the orders were given. The committee received no account of the number of loads, and the only check they had was the tally at their own machine. The agent had his clerk to tally for him, but the payment was made only on the coals received. The coals given to the private consumers were paid for to him, and he paid the money to the agent. It was he who sent the bill at the contract price. The agent gave him a receipt for coals supplied to private individuals, not on the part of the committee. The reason the coals were given at all was that all the yards and sheds at the works were quite stocked, almost to the danger of the works, and an application was made to the shippers with regard to selling the overplus of the cargoes to private consumers. The mayor said the only irregularity he saw in the proceeding was in supplying the coals to private individuals while the contract amount was being delivered at the works. Mr. Hall said no private member of the committee had a right to get the coals at contract price. He moved a resolution condemning the practice he referred to. Mr. M'Donnell moved an amendment, accepting Mr. Otty's answers as satisfactory. He spoke of the management of the gas-works by the committee in complimentary terms. Mr. Lenihan seconded Mr. M'Donnell's amendment, which was adopted.

STOKERS STRIKE AT THE IMPERIAL GAS-WORKS.—On Saturday, Oct. 5, he stokers at the Haggerstone station of this company struck for an advance of wages. It appears that about a month ago a petition was presented by them to the directors, asking for the abolition generally of Sunday labour, without reduction of weekly wages, and with double pay to such men as might necessarily be employed occasionally on that day. The petition also asked for certain restrictions on the employment of non-union men. No reply had been given to the petition, the directors no doubt feeling that having, during the last summer, considerably increased the pay to their men, the present demand for what is practically an advance in wages for a less amount of work, was somewhat unreasonable. The company are not able wholly to dispense with Sunday labour, as is the case with some companies, but it is a rule with them never to enforce work on that day in opposition to conscientious scruples. The men, it would seem, thought their petition was entirely overlooked, and so were irritated to take a step not previously contemplated. Be that as it may, the men, without any previous intimation, marched out of the works at six o'clock in the evening of the 5th inst., leaving the officials of the company to carry on the business as best they could. Of course, immediate action was imperative to prevent any interruption in the supply of gas to the public, and every possible agency was put in operation. Workmen were obtained from all quarters, and by dint of great exertions the officials succeeded in tiding over the dilemma for the night. The next day not one of the stokers employed at the Fulham station of the company came on duty, and the officers there had to resort to similar expedients to those adopted by their brethren at Haggerstone. The men at the St. Pancras station fortunately remained loyal and kept to their work. On Sunday afternoon a meeting of the men on strike was held in the London Fields, Hackney, when the general impression amongst them seemed to be that they had acted imprudently. They had evidently taken a step without their leaders, by whom they were now advised to return to their employment. The men were wise enough to act on this wholesome advice, and the company, being willing to reinstate them, the strike was brought to an end. An interview with the directors was subsequently sought by a deputation from the stokers, and it is understood that, with reference to Sunday work, the men have consented to the pay of a day and a half instead of the required double pay. It is to be hoped that the other questions at issue may be satisfactorily disposed of.

FAVERSHAM GAS SUPPLY.—The following resolution was passed by the committee appointed at a public meeting held in the town-hall, on the 16th ult.,

to consider the proposed increase in the price of gas from 5s. per 1000 (with discount of 5 per cent. for cash within a month) to 5s. 10d. per 1000 without discount:—"That the mayor and Messrs. Higham, Goldfinch, C. Smith, J. A. Anderson, jun., and H. Shepherd, be deputed to meet the directors of the gas company, and inform them that the committee consider 5s. 6d., with 3d. discount, is a sufficient charge for gas at the present time, and request them to undertake to publish annually for the information of the consumers an abstract of their accounts and the names of the directors; also to ask the company to consent that when the term of office of any directors non-resident in Faversham expires, their places shall be supplied by the election of directors from shareholders resident in Faversham." A copy of this resolution was forwarded to the gas company, the directors of which have replied as follows:—"After making calculations, and earnest consideration, the directors have come to the conclusion that the present price of coal will not admit of gas being supplied at a lower rate than that proposed, and in the absence of any evidence to the contrary they feel bound, in justice to their shareholders, though with much regret, to adhere to their new scale. The directors beg to express a hope that when more consideration has been given to the matter the very exceptional character of the time and prices charged for gas at other small towns under similar circumstances throughout the country—the consumers will feel satisfied that they have not been illiberally treated. That with respect to the publication of a balance-sheet, the directors have no objection to supply a copy of their next and all future yearly accounts to any consumer, on application. That as to the appointment of local directors when the non-resident ones retired by rotation, such retirement cannot take place unless one or both of the only two non-residents cease to hold sufficient shares." The committee of gas consumers met in the Council Chamber of the Guildhall on Thursday, the 10th inst. The mayor and about twelve other members of the committee were present. The town-clerk read the reply of the directors of the gas company, which was considered unsatisfactory. The town-clerk was requested to write to the directors to that effect, and to inform them that the committee would take further steps in the matter if they thought it desirable to do so. The question of starting a fresh company was then gone into, and it was ultimately resolved that a competent engineer or gas manager be employed to give an estimate of the cost of erecting new works.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE GAS SUPPLIED IN ST. MARYLEBONE, DURING THE MONTHS OF AUGUST AND SEPTEMBER, 1872:—

August, 1872.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quantity of Sulphur in 100 Cub. Ft.	Mean Quantity of Ammonia in 100 Cub. Ft.	Sulphuretted Hydrogen.
	*Mean of 22 Obsers.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas . . .	16·19	17·50	15·50	26·15	9·13	32·62	0·31	None.
Chartered Company's common gas	16·78	17·90	16·00	32·92	15·43	10·98	0·48	None.
Chartered Company's cannel gas	23·29	24·40	21·60	31·23	16·42	25·52	0·93	None.

Mean of daily readings of barometer . . . 29·83
" " " thermometer . . . 71·16

September, 1872.	*Mean 13 Obs.							
Imperial Company's gas . . .	17·13	17·70	16·40	26·00	9·96	35·95	0·51	None.
Chartered Company's common gas	17·31	18·60	16·70	36·40	16·70	11·74	0·81	None.
Chartered Company's cannel gas.	23·04	23·60	22·50	34·28	16·36	28·74	0·55	None.

Mean of daily readings of barometer . . . 29·58
" " " thermometer . . . 66·58

* Each observation consists of 10 readings of the photometer, at intervals of one minute.

Throughout the months of August and September the illuminating power of the three gases consumed in the parish was most satisfactory. The mean light of the Imperial Company's gas was, during the period, equal to 16·66 candles; it ranged between 17·70 and 15·50 candles. The mean light of the common gas of the Chartered Company was equal to 17·04 candles; it ranged between 18·60 and 16·00 candles. The mean light of the cannel gas was equal to 23·16 candles; it ranged between 24·40 and 21·60 candles. The amount of sulphur impurity found during both months in the Imperial Company's gas was very large. In August it was 32·62 grains per 100 cubic feet, and in September, 35·95 grains. On the other hand the quantity of sulphur impurity found in the common gas of the Chartered Company was unusually small, amounting only to a mean of 11·36 grains. This probably is due to the use of lime as a purifying agent; and it is to be regretted, for the sake of the public health and comfort, that the same agent cannot be used at the Imperial Gas-Works. The quantity of ammonia, it is satisfactory to observe, has been reduced almost to a minimum in all the gases, amounting to an average of about half a grain in the 100 cubic feet. The pressure of all the gases has been satisfactory, and on no occasion was sulphuretted hydrogen detected in either of them. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas, manufactured at their works, Horseferry Road, Westminster.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE WATER SUPPLIED IN ST. MARYLEBONE, DURING THE MONTHS OF AUGUST AND SEPTEMBER, 1872:—

August, 1872.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by Incineration of Solid Matter in previous column.		Ammonia.
	Aug., 1871.	Aug., 1872.	Aug., 1871.	Aug., 1872.	
Distilled Water . . .	0°	0°	0°	0°	0°
West Middlesex water .	16·78	17·14	0·74	0·70	0·001
Grand Junction water. .	16·96	16·98	0·78	0·70	0·000

September, 1872.	Sept., 1871.	Sept., 1872.	Sept., 1871.	Sept., 1872.	
Distilled Water . . .	0°	0°	0°	0°	0°
West Middlesex water .	17·04	16·94	0·70	0·68	0·000
Grand Junction water. .	18·06	17·04	0·69	0·72	0·001

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

The water supplied to the parish during the past two months has been perfectly clear and bright. It is somewhat startling to observe that Dr. Frankland, in his analysis of the metropolitan water supply for September, gives 960 as the estimated amount of previous sewage or animal contamination in 100,000 parts of the West Middlesex water, and only 490 in the Grand Junction water. Bearing in mind that both these companies derive their supply from the Thames a little above the town of Hampton, and that the intakes of both companies are but a very few yards apart, it would be interesting to know how this very great excess of previous pollution in the water of one company, as compared with that of the other, is to be explained. Possibly there may be a misprint of the figures.

FAILURE OF A SEWAGE IRRIGATION EXPERIMENT.—The Warwick Town Council, after trying the system of sewage irrigation for five years, have resolved to advertise the sewage farm as to be let. The accounts for the period named, which were submitted at the council meeting yesterday, showed a balance in hand of £36, which, with the value of the growing crops and implements on the farm, made the total receipts just equal to the expenditure. The council had, however, found that the demand for rye-grass was decreasing, and, in view of the uncertainty of realizing hay crops, resolved to let their farm.

HUDDERSFIERD NEW WATER-WORKS.—On Saturday, the 5th inst., the mayor of Huddersfield (Mr. Wright Mellor) laid the foundation stone of the shaft and culvert, at Blackmoor Foot, of a new reservoir which is being constructed there in conjunction with another reservoir at Deerhill (also in course of construction), for the purpose of giving to Huddersfield more pure water than can be obtained from the existing forces. The mayor was presented with a silver trowel and a mahogany mallet, and having completed the ceremony he delivered an address, in the course of which he said that the new reservoir would hold 600,000,000 gallons of water. Mr. Hawksley, the engineer of the works, said that he anticipated the people of Huddersfield would soon be in the receipt of a better supply of water, and the reservoirs which were in course of construction would serve this generation and part of the next. The company afterwards partook of luncheon at the Queen Hotel, the mayor presiding.

LIVERPOOL WATER SUPPLY.—"A Member of the Liverpool Town Council" writes with reference to an article copied from the *Pall Mall Gazette* into the *Times*. "This article," he says, "conveys an erroneous impression of our real position now. Instead of having declined to spend £1,500,000 to obtain a sufficient supply, we have already expended £2,200,000. For this we have a storeage at Rivington of 2800 million gallons, now full to overflowing, shortly to be increased by a new reservoir capable of holding 1 million gallons more. From this place we draw as much as can be passed in the 24 hours through our 44-inch mains. Another pipe-line will, I think, soon be constructed. From wells in this locality we draw about one-third of our wants, Rivington supplying the remainder. The town receives over 100 million gallons per week, or equal to upwards of 25 gallons per inhabitant per diem—a quantity more than any other town has supplied to its residents. The well that has become somewhat polluted, to which reference is made, and which is for the present disused, is the smallest we have, and from which we never received more than 10 per cent. of our requirements. This well has been in use for many years, and up to this year yielded as pure water as could be obtained; but, without any change or increase in the residences in the neighbourhood, it shows this year traces of sewage filtering through the water-bearing strata."

SUPPLY OF WATER FOR MANUFACTURING PURPOSES AT GLASGOW.—At the meeting of the Glasgow Water Commission on the 3rd ult., a report was submitted by Mr. Gale, engineer, with reference to the means of procuring a supply of water for the use of factory owners, and for manufacturing or general business purposes throughout the city. In this report Mr. Gale enters into the subject at considerable length, and concludes by submitting the following conclusions:—

1. If all the water is taken which the manufacturers can demand under the Act of 1866, the quantity will be 6,875,000 gallons a day of ten hours, and the average price to be paid by them for it is 6s. 7½d. per 100,000 gallons. 2. After making large additions to the estimates of the proposed Westthorn works, on account of the recent rise in the price of materials and labour, I estimate that the 6,875,000 gallons a day might still be delivered at the rate of 6s. 4d. per 100,000 gallons. 3. That water cannot be pumped from the Clyde to a sufficient height to be distributed over any large portion of the city for less than 18s. 1d. for 100,000 gallons for works alone, which is more than the present cost of the Loch Katrine water, including all charges. 4. That it is inexpedient to have a duplicate set of distributing pipes over a large area, conveying an inferior quality of water. 5. The amount to be saved by abandoning the pumping, as proposed at Westthorn, and substituting a gravitation scheme, is represented by a capital sum of £53,105. 6. That the cost of works to bring down water from Carmyle for the factory owners would be £72,340, exclusive of compensations, and as it would only be delivered at the level of the river, it could not be considered an implement of the obligations under the Act. 7. That water cannot be introduced from the Clyde by gravitation from any point nearer than Garrion Mill; that the cost for 6,875,000 gallons a day, delivered into the reservoir at Westthorn, would be £227,000, or more than four times the sum saved by abandoning the pumping. 8. That to introduce additional water into the Monkland Canal from the South Calder would cost £132,000, exclusive of arrangements for the use of the canal; that the water is not good, and would be further polluted by mixing with the North Calder water in the canal, and by sewage flowing into the canal. 9. That sufficient storeage for the supply of the factory owners cannot be obtained at Castle-Semple and Kilbirnie Lochs, and that the lochs themselves are at too low a level. 10. That all the water that can be furnished by the existing Loch Katrine and Gorbals works will probably be taken up by the ordinary requirements of the city in 7½ years from this date. 11. That of all the other sources that have been proposed for the supply of water to the city generally, the Earn and White Cart scheme alone can be put in competition with Loch Katrine, either for manufacturing or domestic purposes; and that, while the cost of additional water from these sources will not be much less than that presently supplied, if taken in large quantities, the Earn and White Cart scheme admits of a small quantity of water being got at less cost than from Loch Katrine. Lastly. That no water can be got from any source to implement the terms of the Act of 1866 at so small a cost as that proposed under that Act, and if the supply from that source is to be extended beyond the requirements of the agreements with the factory owners, it should only be over a small area of the city on a low level.

This report was submitted to a meeting of the special committee, on the 23rd ult., and it was agreed to recommend the commissioners "to apply to Parliament for an extension of time to complete the works already authorized by the Act of 1866, as they are satisfied that these works are the best and cheapest mode of supplying water for the purposes contemplated by the Act." The Lord Provost moved the adoption of the minutes. Bailie Salmon moved, as an amendment—"That, before any further steps were taken in the matter, the commissioners should take the opinion of an independent engineer in regard to the recommendation of Mr. Gale." Dr. M'Intyre moved a second amendment—"That it is inexpedient to take any action for the removal of the weir until measures have been taken to diminish the present polluted state of the river below the weir." The two amendments were voted on, with the result that Bailie Salmon's was carried by 20 to 14. The Lord Provost's motion and Bailie Salmon's amendment were then put to the meeting, when the motion was carried by 19 to 17 votes.

Register of New Patents.

2345.—JOSEPH CARTER BELL, of Cheadle, in the co. of Chester, chemist, WILLIAM DOMINICK GREGG, of the same place, manufacturing chemist, and RICHARD ROPER KELLY, of Manchester, in the co. of Lancaster, chemist, for "*Improvements in the utilization and purification of the liquor arising from the washing or 'scrubbing' process of the manufacture of illuminating gas.*" Provisional protection not allowed. Application dated Oct. 24, 1871.

It is well known that gas for illumination is submitted to a washing or "scrubbing" processs for the purpose of depriving it to a certain extent of ammonia and sulphuretted hydrogen and sulphide of ammonium, and that a liquor arises therefrom which is impregnated with those substances. By this invention the said liquor is firstly utilized by rendering it suitable and by applying

it continuously for repeated washing or "scrubbing" processes. To effect this the ammonia is boiled off into sulphuric acid or other substance to form a salt of ammonia, and when this is effected it is found that the liquor may be used for the washing or scrubbing process in place of the water now employed for that purpose, and by this utilization of the liquor the necessity of its removal from the gas-works is avoided. During the boiling of the liquor sulphuretted hydrogen is evolved, which is passed through a purifier containing a metallic salt. According to another method the liquor is purified previously to the boiling by adding thereto an oxide or metallic salt, by which means a sulphide is precipitated and the nuisance arising from the sulphuretted hydrogen is therefore avoided.

2886.—PHILIP CHARLES EVANS, of Brimscombe, in the co. of Gloucester, cloth manufacturer, for "*Improvements in lighting and heating, and in apparatus employed therefor.*" Provisional protection only obtained. Dated Oct. 27, 1871.

This invention relates to the mode of supplying and regulating the supply of air to the burners of oil-lamps, gas-lights, and gas-stoves when double chimneys are applied thereto, and consists in the application to the lower mouth of the outer one of the two chimneys surrounding the burner, which is preferred to be an Argand burner, of two perforated plates either in the form of slide-valves or dampers, flat discs, cups, or rings, but in all cases fitting close together. One of these perforated plates, cups, or rings is made adjustable over the other, so that on turning it the exact amount of air to be supplied through the lower mouth of the outer chimney of the burner, whether of a lamp or gas-stove, may be regulated with the greatest nicety.

2926.—ADOLPHE PIERRE VASSARD, of New Cross, in the co. of Kent, chemist, for "*Improvements in treating liquid sewage and other ammoniacal liquors.*" Patent dated Nov. 1, 1871.

This invention consists in treating liquid sewage and other ammoniacal liquors to obtain precipitates therefrom, suitable as manure or for other purposes, by submitting the liquid sewage or other liquor to the action of two chemical compounds, the first consisting of a mixture of oxide of barium and biphosphate of lime, and the second of a mixture of chloride of magnesium and aluminate of soda. Instead of the said agents, the following may be employed—viz., sulphide of barium, common superphosphate of lime, or any other soluble phosphate, and sulphate, or any other soluble salt of magnesia, lime, or any other alkali, or alkaline earth, or silicate of soda.

2937.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*An improved construction of engine for raising water.*" A communication. Provisional protection only obtained. Dated Nov. 1, 1871.

This invention consists in the employment of two cylinders surmounting and opening into a channel-plate. In each of the cylinders is a piston connected through its rods and links to either end of a walking beam for producing a steady continuous discharge of water. By means of a peculiar arrangement of valves and tappets, steam is alternately let into each cylinder on top of the piston, forcing it down and expelling the water from its under side through the channel plate and discharge-pipe.

2948.—ALFRED TYLOR, of 2, Newgate Street, in the City of London, brassfounder, for "*Improvements in lavatories, the basins, cocks, taps, valves, and apparatus and arrangements connected therewith, parts of which improvements are applicable for other purposes for controlling and regulating the discharge of liquids and fluids, and preventing waste.*" Provisional protection only obtained. Dated Nov. 3, 1871.

This invention has the following objects:—The lavatory basins are made with large wastes accessible for cleaning out. The supply taps and valves to them close of themselves after a definite quantity of water is drawn off by means of a loose falling valve bedding on a cushion of water, without tremor or noise when required. The shut-off valve for closing the water passage into the lavatories, when the supply taps or valves are being repaired or changed, is automatic, and applicable to every kind of tap, or valve, or pipe when required.

3019.—EDWARD BARNES, of High Holborn, in the co. of Middlesex, engineer for "*Improvements in gas-furnaces.*" Patent dated Nov. 9, 1871.

This invention consists in fitting into a suitable frame a mass of fire-clay or cement, having one or more apertures through it, into which perforated tubes, open at the top, fit loosely. These tubes are closed at the bottom, where they are connected to a supply of gas, and are adjustable so that they can be fixed in any desired position to admit more or less air to mix with the gas. At the upper end of the apertures in the fire-clay is a hollow case or box having at its sides holes through which the heated air and gas pass. An annular mass of twisted wire or porous non-inflammable substance is sometimes placed outside this box or case in order to distribute the heat, and a ring outside to prevent the heated gas and air from escaping laterally. Legs or stands are fixed to the top of the apparatus, upon which may be placed anything to be heated, and they may also serve as guides for the ring described.

3023.—PETER GENT, of New Brighton, in the co. of Chester, for "*An improved portable gas-oven for culinary purposes.*" Patent dated Nov. 9, 1871.

According to this invention, the oven may be constructed of fire-brick, tiles, terra-cotta, porcelain, or earthenware of any description. The bottom and top are composed of two slabs of earthenware having a small raised ledge all round. The sides and back end are composed of smaller slabs of earthenware made so as to tongue, groove, or rabbet together and fit between the top and bottom slabs, thus forming the sides. The ledge in the bottom slab is higher on the front side, and is fitted with apertures through which pass gas-pipes. The top of the oven is fitted with a flue to carry away waste heat. The oven is fitted with shelves, the sides of which have apertures to distribute the heat. The shelves are of earthenware, and held in position by grooves or lugs in the side of the oven, which is fitted with a door of earthenware or iron, and inside is a second door opening in two parts, top and bottom. The whole is mounted on casters or wheels, or is fitted on a carriage, the gas being supplied by a flexible tube.

3045.—BRISTOW HUNT, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, gentleman, for "*Improvements in water-meters.*" A communication. Patent dated Nov. 10, 1871.

This invention relates to that class of meters known as reciprocating water-meters, and consists mainly of an air-tight floating piston working in a cylinder, and a peculiar arrangement of ports and valves, whereby a perfect reciprocal motion is obtained, which is suitably imparted to registering devices.

3090.—SAMUEL SMITH, of Aston, near Birmingham, in the co. of Warwick, gentleman, for "*Improvements in sliding gas chandeliers or gaseliers, and other sliding gas-lamps.*" Provisional protection only obtained. Dated Nov. 15, 1871.

This invention consists in supporting and adjusting chandeliers and other sliding gas-lamps by the following arrangement of parts. The gas supply-pipe or tube from the ceiling has at its bottom a screw-box in which a quick-threaded screw works. This screw is hollow or tubular, and conveys gas to the body of the chandelier, the lower part of the screw turning in the body and supporting it by a collar. A tube from the body slides, but is incapable of turning upon the fixed supply-tube or pipe. At the bottom of the hollow screw is a worm-wheel, with which a worm gears. By rotating the worm the central hollow screw rises or fall in its screw-box, carrying with it the body of the chandelier. The height of the chandelier is thereby adjusted, the screw being prevented from running down by the toothed gearing at its bottom.

3153.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in combined apparatus for the filtration and distribution of water.*" Patent dated Nov. 21, 1871.

This invention consists in fitting charcoal boxes and filtering apparatus inside water-posts, so as to purify and filter the water as it is drawn off. The water which remains in the filter when the supply is shut off is allowed to flow to waste, traversing the filtering medium in the reverse direction, and thereby cleansing the same each time it is used. A peculiar ball-cock is fitted to a separate pipe for the supply of unfiltered water when required, and provision is made for thoroughly flushing or cleaning the filters periodically as required, by forcing water through the entire apparatus in a reverse direction by means of a hand-pump, fitted to the delivery-spout or nozzle, a special outlet-valve being previously opened for the escape of the foul water.

3156.—JAMES BLICK, of 17, St. Paul's Road, Camden Town, in the co. of Middlesex, for "*An improved apparatus for impregnating atmospheric air with hydrocarbon vapours for heating and lighting purposes.*" Patent dated Nov. 22, 1871.

This invention consists in constructing a portable apparatus, for impregnating air with hydrocarbon vapour, and consists of a closed shallow chamber having a zig-zag or spiral passage formed in it filled with horsehair or other absorbent material saturated with hydrocarbon liquid. On the top or at the side of this chamber is fixed a fan or blower actuated by clockwork mechanism, which forces air in at one end of the zig-zag or spiral passage, which air is thus made to pass along the entire length of such passage, so as to become impregnated with hydrocarbon vapour, and to issue through an escape aperture at the other end of the passage into a pipe for conducting it to wherever required. A cock is provided for closing the communication between the chamber and the fan when the apparatus is not at work.

3189.—CHARLES DENTON ABEL, of 20, Southampton Buildings, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in rotary or centrifugal pumps.*" A communication. Patent dated Nov. 24, 1871.

These improvements consist, firstly, in constructing rotary or centrifugal pumps with a piston-wheel revolving in a scroll cylinder or casing of ordinary construction, such piston-wheel having hollow curved arms extending from a central chamber (into which the water or other fluid to be raised enters) to a circular rim forming the periphery of the piston-wheel; secondly, in combining with such centrifugal pumps an auxiliary force or suction pump for priming or filling the pump when this is required for use as a suction pump.

3217.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*Improvements in lamps or lanterns, chiefly designed for out-of-door situations.*" A communication. Patent dated Nov. 28, 1871.

This invention consists in making the glass which surrounds and protects the light or flame in one single piece. It is pear-shaped or oval, and open at the top and bottom, and provided with a suitable chimney. The lower part of the glass encircles the burner, and the upper forms a dome above it. At the part where the dome merges into the lower part, the glass has a flange or rim by which it is suspended. These improved lamps are provided with reflectors, either concave or convex. The surface of which is formed by enamelling them.

3245.—RICHARD BROWN EVERED, of 28, Drury Lane, in the co. of Middlesex, brassfounder, for "*Improvements in taps or valves.*" Nov. 30, 1871.

This invention consists of apparatus for drawing off water in measured quantities to prevent waste, together with a stop-cock, with the stops at the lower end of the plug.

3263.—WILLIAM MANN, of the gas-works, Dorset Street, in the City of London, engineer, for "*Improvements in the method of purifying gas, and in the apparatus employed for that purpose.*" Patent dated Dec. 2, 1871.

The object of this invention is to remove the sulphur compounds other than sulphuretted hydrogen from gas, and consists in passing crude gas through a purifier containing hydrate of lime, until the lime is converted into sulphide or sulphides of calcium. The gas is then shut off from that purifier and passed through another containing hydrate of lime, thence through vessels containing oxide of iron, and then through the sulphide of calcium in the vessel first mentioned. The gas is subsequently passed through another purifier containing oxide of iron, the effect of the whole process being to render the gas practically free from sulphur in any form.

In order to ensure the greatest amount of success that can attend the use of the foregoing method, the inventor has devised and uses in conjunction with it an improved construction of purifier, to which the inlets and outlets are so arranged that the gas, instead of going upwards through all the layers of the purifying agent, is made to traverse half the number of layers (or thereabouts) upwards, and the remaining number of layers downwards. This is accomplished by making the number of layers of purifying material one less in the lower half, or should the number be equal in each half, by charging the layers on the lower half a little lighter than those on the upper half. The consequence is that the gas takes its course through the lower layers first, and continues to flow in that direction until the material composing the lower half is nearly saturated, whereupon the gas will commence flowing downwards through the upper half of layers until a balance of resistance is induced by the saturation of the upper layers. Immediately on this taking place, the gas will divide into two currents, one going upwards and the other downwards, thereby keeping the pressure low and producing a more perfect purification than by the vessels now in use.

3280.—HENRY EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvements applicable to street and other gas-lamps, for the purpose of preventing stoppages in the supply-pipes.*" A communication. Patent dated Dec. 5, 1871.

The present invention consists in the employment, as an isolating body, of an envelope or tube of tarred deal or other wood to enclose the gas-pipe.

3285.—ALEXANDER JERVIS, of Edinburgh, in the co. of Mid Lothian, N.B., for "*Improvements in economic water-supply apparatus.*" Patent dated Dec. 6, 1871.

In this invention the water from a cistern or service-pipe has access to the interior of the apparatus through a simple inlet-valve opening into a passage leading to a closed chamber and to a valve-seat or aperture, through which last, when open, the water finds its way by a pipe to the closet basin. The closed chamber has fixed in its top a diaphragm of a flexible material, and to the upper outer side of this there is fixed a valve-piece capable of closing the valve aperture leading to the basin. When the closet handle is raised a lever in connexion with it opens the inlet-valve, and the water at once passes through the other valve, which is then open to the basin. At the same time the water also enters the closed chamber, and, on filling, it causes its diaphragm to bulge out and close the valve leading to the basin, so that the water passing directly to the basin does so only during the time taken to fill the chamber. The closed chamber has a valved outlet also leading to the basin, and when the closet handle is lowered this outlet-valve is opened and the inlet-valve closed, the water then passing from the chamber to the basin forming the hydraulic seal.

3297.—THOMAS CHARLES EBDY, F.R.I., B.A., of the city of Durham, architect, for "*Improvements in stoves for warming, ventilating, and disinfecting buildings heated by gas, coke, mineral oils, or other fluids.*" Patent dated Dec. 7, 1871.

This consists in constructing gas-stoves with long tubes or chimneys inclosed within other tubes, with an inverted cylinder and air-tight cover, fitted also with radiating heaters or zig-zag circular gills. Coke, mineral oils, and other fuels may be used, and the stove may be used for disinfecting, warming, and ventilating buildings.

3325.—WILLIAM ROBERTS, of Westferry Road, Millwall, in the co. of Middlesex, for "*Improvements in valves for supplying water to cisterns.*" Provisional protection only obtained. Dated Dec. 9, 1871.

This is the invention of a valve by which the quantity delivered may be regulated from a few drops per hour to the largest quantity that can pass through the full bore of the inlet. No washer or stuffing-box is required.

3335.—JOHN SOMERVILLE, gas engineer, and JOHN ROBINSON, mechanic, both of the gas-works, in the city of Dublin, for "*Improvements in machinery or apparatus for charging, discharging, and scurfing retorts and furnaces.*" Patent dated Dec. 9, 1871.

This invention consists in forming within the retort-house a tramway, whereon rolls a platform having an engine and boiler on one side, and a strong quadrilateral frame on the other, which supports a secondary platform or cradle. The cradle carries a scoop or scoops for charging, and a rake for discharging or drawing. The scoops are filled from a sliding shoot supplied with coal by an archimedean screw in a receptacle above, into which coal is lifted by an elevator. While the scoop is being driven into the retort it is at the same time being filled with coal. On arriving at the extremity of the retort the scoop is turned over by the action of a volute spring upon an upright shaft operating on two bevel wheels. The motion is then reversed and the scoop withdrawn, scraping the retort in its transit. The hoe or rake bar is made U-shaped, with a sliding bar in the hollow to raise or depress the blade. It is also provided with a spring to give it elasticity and prevent injury to the retort.

For scurfing, the apparatus is furnished with a hollow bar terminating in a boss or head having cutters fixed thereto. This is made to revolve rapidly against the retort, the carbon being thereby speedily detached.

Some parts of the apparatus which are exposed to great heat are made hollow to admit of water or steam being supplied thereto to keep them comparatively cool.

The whole of the foregoing may be combined in one apparatus, but it is preferred to have two separate machines, one for charging and the other for drawing. Any suitable motive power may be used as a substitute for steam.

3338.—HENRY JOSIAH JUPP, of Thomas Street, Burdett Road, Limehouse, in the co. of Middlesex, wharfinger, for "*The manufacture of an improved composition for making or covering roads and footways, and for other analogous purposes.*" (Complete specification.) Patent dated Dec. 11, 1871.

The novelty in this case consists in making a hard and durable composition for roads, &c., by means of a mixture of dried clay and coal tar, and the carbonizing and deodorizing of the volatile oils of the latter by the addition of sulphuric or nitric acid (with or without the oxide of manganese) aided by heat.

3342.—WILLIAM VERITY and BENJAMIN VERITY, both of 127, Regent Street, in the co. of Middlesex, for "*An improved perforated fire-clay gas-burner, adapted for heating or cooking purposes.*" Patent dated Dec. 11, 1871.

According to this invention the burners are made in fire-clay or any similar material; and in shape are either square, circular, or oval, adapted to stoves, grates, or fireplaces, for any heating or cooking purpose whatsoever to burn plain gas or air and gas combined.

3344.—JAMES MOFFAT, of the firm of J. F. Allan and Co., of Glasgow, in the co. of Lanark, N.B., gas engineers, for "*Improvements in apparatus for making illuminating gas.*" Patent dated Dec. 11, 1871.

In carrying out the present invention the retort is made of a cylindrical form, and is placed centrally in a vertical cylindrical furnace, which last is an iron shell having within it a fire-brick fire-box, with a space for the passage upwards of the flames from a grate at the lower part between the fire-brick and the retort. The retort is formed with an outlet branch pipe for the gas at the side close to the top, and the retort-cover is fitted to the top, the cover and retort-mouth being both engine-turned to make a close joint without luting. The smoke and gases from the furnace pass up a vertical funnel directly over the top of the retort, and a hood arranged to slide telescopically in the upper fixed part of the funnel is suspended by chains passing over pulleys to counterweights.

3348.—GEORGE EVELEIGH, of 16, Asylum Road, Peckham, consulting chemist, for "*An improved means of purifying gas from ammonia.*" Patent dated Dec. 11, 1871.

The invention consists in passing the gas, after it has passed through the ordinary oxide of iron or lime purifiers, through another purifier containing sulphate of iron, copper, zinc, or other suitable metallic salt in crystals, whereby the last particles of ammonia are chemically removed from the gas before it finally passes on to the holder. Sulphate of ammonia is formed in the said last purifier, and an ammoniuretted metallic oxide also remains, which may be used as a pigment.

3357.—GEORGE EVANS, of Norwich, in the co. of Norfolk, gas manager, for "*Improvements in the manufacture of asphalte or composition adapted for paving and other similar uses.*" Patent dated Dec. 12, 1871.

This composition is made from the following ingredients (by bulk)—viz., eight parts of clinker, three parts and a half of sand, two parts of lime, two parts of shingle, and three parts of tar. Breeze is sometimes used in the proportions of one part and a half, in order to produce, by its heat in burning, the requisite heat for carrying on the process of manufacture.

3367.—JOSEPH BRAY, of Ashton-under-Lyne, in the co. of Lancaster, brass-founder, for "*Improvements in apparatus for measuring water and other fluids.*" Patent dated Dec. 13, 1871.

This invention relates principally to water-meters. The piston is of a cylindrical form, and each end thereof is connected with the corresponding end of the meter-cylinder, by means of a flexible tube which folds within itself as the piston moves. A conical valve is employed, the said valve having a cavity in the side which places the inlet port in communication with the cylinder ports. An opposite cavity balances the pressure on the valve. The exhaust flows through ports into the interior of the valve and passes out through the ends thereof. A flexible tube attached to the valve-spindle, and to the bush in which it works, makes a fluid-tight joint for the said spindle.

3396.—CHARLES WEIGHTMAN HARRISON, of South Kensington, in the co. of Middlesex, gentleman, for "*Improvements in gas-burners.*" Patent dated Dec. 14, 1871.

The first part of this invention relates to constructing the burner of two or more parts, which, when fitted together for use, will leave a space between them, through which aperture either clear or with a wick held therein the gas passes for lighting. The distance between the parts is regulated by a screw or other suitable means, so as to produce at pleasure a thick or thin sheet of flame. The burner is generally made of two circular parts either flat or of a conical or hemispherical shape, around the base or edges of which an unbroken ring of light is produced. Sometimes around the said bases or edges a ring of jet lights is formed by drilling therein one or more circles of small holes close together. The second part consists in platinizing the inner face or surface of the burner over which the gas has to pass, or platinum black or sponge or a platinized substance is placed between the pieces of the burner. The third part consists in forming an inner chamber in the burner of platinized wire gauze, or other suitable material, through which the gas or air or other vapour to assist in the combustion is made to pass to the light, and platinized carbon, or other platinized or porous substances is sometimes placed therein, either alone or saturated with a carburetting or other suitable liquid or a volatile solid. The fourth part relates to attracting the oxygen of the air to the burner by forming it either wholly or partly of magnetic steel. Or instead magnetic steel filings or magnetic iron sand is placed in the interior of the burner through which the gas or the air or other vapour is made to pass, and thus become polarized. The fifth part consists in charging separate parts of the burner with electricity, so as thereby to produce a different polarity in them, and in causing a discharge of such polarity through the platinized surface or part of the gas, air, or vapour. The sixth part consists in forming suitable parts of the burner or wick of asbestos, talc, or other non-combustible substance. The seventh part relates to the application of a reflector or refractor to the burner made of any suitable material, and shaped for the purpose of distributing the deflections or refractions of light either in a regular or scattered manner. The reflector is sometimes made hollow and a liquid placed therein, the vapour of which may be made available for producing or aiding in the light. The eighth part consists in forming a chamber within the circle of light, so as to heat the gas during its passage to the aperture where it is ignited.

3432.—FREDERICK HURD, of the Albion Foundry, Wakefield, in the co. of York, engineer, for "*Improvements in the construction of main-pipes for air, gas, water, and other purposes, and in the pavement of streets and roads.*" Provisional protection only obtained. Dated Dec. 19, 1871.

This invention consists in so constructing the main-pipes for air, gas, water, telegraph wires, and other purposes, that the upper surface of the said pipes shall form either the gutters or part of the pavement or footpath of the street or road. Also in making the pavement of cast-iron frames, with cells for the asphalte or other blocks.

Share List of Metropolitan Gas Companies.

(*Corrected by Mr.* F. N. GOLDING, *Sun Court, Cornhill, from the latest Stock Exchange Quotations.*)

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£		£ s. d.	£ s. d.	£
8000	20	Anglo-Romano	20 0 0	10 0 0	20 — 22
5000	20	Bahia (Limited)	20 0 0	3 0 0	10¼— 11
1008	20	Do., preference	20 0 0	10 0 0	23 — 25
750	20	Do., do., redeemable	20 0 0	10 0 0	21 — 23
40000	5	Bombay (Limited)	5 0 0	6 15 0	5¾— 6¼
10000	5	Do., third issue	4 0 0	6 15 0	½—1pm.
10000	20	British (Limited). (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton (Potteries), Trowbridge., and Holywell.)	20 0 0	10 0 0	34 — 36
7500	20	Cagliari (Limited)	20 0 0	7 0 0	19 — 20
120000	10	*Chartered* A shares	10 0 0	10 0 0	15¾— 16
10000	10	Do., B shares, 4 per cent. max.	10 0 0	4 0 0	6¾— 7¼
25000	10	Do., 5 per cent. preference	10 0 0	5 0 0	12¼— 13¼
20000	10	Do., 5 per cent. preference, second issue	8 0 0	5 0 0	2¾—3¼ pm.
20000	10	Do., 10 per cent. preference	10 0 0	10 0 0	19 — 20
12000	25	Do., D shares	25 0 0	10 0 0	49 — 50
17490	100	*Commercial*	100 0 0	10 0 0	159 —160
20000	20	Continental Union	20 0 0	8 0 0	22¾— 23
10000	20	Do., new	10 0 0	8 0 0	1¼—2pm.
10000	20	Do., preference (Grmny.: Strsbg. France: Cette, Nismes, Montargis Vienne, Roanne, Beaucaire, Rueil, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	24 — 26
5000	10	*Crystal Palace District*	10 0 0	10 0 0	15¼— 16¼
5000	10	Do., preference	10 0 0	6 0 0	11¾— 12
6624	10	Do., new shares	10 0 0	7 0 0	13¾— 14¼
3376	10	Do.	1 0 0	7 0 0	1—1¼ pm.
23406	10	European (Limited)	10 0 0	8 0 0	14¾— 15¼
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	8 0 0	2¼— 2½
5000	10	Hong Kong (Limited)	10 0 0	10 0 0	12¼— 13¼
1560000	100	*Imperial*	100 0 0	10 0 0	164 —166
26000	12½	Do., new shares	12 10 0	7 0 0	15¼— 16
1300	100	Do., bonds	£100	10 0 0	195 —200
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam., Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	9 2 6	64 — 66
3000	40	*Independent*	40 0 0	10 0 0	66 — 68
3000	10	Do.	10 0 0	5 0 0	7¼— 8¼
3000	20	Do.	20 0 0	7 10 0	24½— 25½
250000	Sk.	*London*	100 0 0	10 0 0	157 —160
£15000	Sk.	Do., 1st preference	100 0 0	6 0 0	117 —120
	Sk.	Do., 2nd preference	100 0 0	6 0 0	
	Sk.	Do., 3rd preference	100 0 0	6 0 0	
£18781	100	Do., 1st preference stock	100 0 0	6 0 0	
£11828	100	Do., 2nd preference stock	100 0 0	5 0 0	
15000	5	Malta and Mediterranean (Limited)	5 0 0	5 0 0	3¾— 4¼
6000	5	Do., preference	5 0 0	7 0 0	5¾— 6¼
20000	5	Mauritius (Limited)	2 0 0	7 0 0	2¼— 2½
25000	20	Monte Video (Limited)	20 0 0	—	¼dis.—¼pm.
8000	10	Nictheroy, Brazil (Limited)	10 0 0	—	1¼—½ dis.
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6¾— 7¼
30000	5	Do., new shares	2 10 0	9 0 0	1¼—1¾ pm.
10000	5	Ottoman (Limited)	5 0 0	nil.	2 — 2¼
17500	10	Parà (Limited)	10 0 0	6 0 0	10 — 10½
27000	20	*Phœnix*	20 0 0	10 0 0	33 — 34
$600000l.	100	Do., new	45 0 0	7 10 0	13—15 pm.
1440000*l.*	Sk.	Do.	100 0 0	5 0 0	89 — 91
5000	20	*Ratcliff*	20 0 0	10 0 0	32 — 34
34000	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	34 — 36
7359	5	Singapore (Limited)	5 0 0	7 0 0	5 — 5¼
2000	5	Do., preference	5 0 0	7 10 0	5¾— 6
1500	32½	Shanghai	32 10 0	12 0 0	
4000	50	*South Metropolitan*	50 0 0	10 0 0	82 — 84
4000	12½	Do.	12 10 0	10 0 0	20 — 21
20000	12½	Do., new shares	2 10 0	10 0 0	4—5 pm.
15000	10	*Surrey Consumers*	10 0 0	10 0 0	15¾— 16
10000	10	Do., new	6 0 0	10 0 0	4 — 5
9000	4	United General (Limerick)	4 0 0	5 0 0	2¼— 2½
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	13 — 14
1500	10	Do.	10 0 0	7 10 0	7¼— 8
1819	10	Do.	10 0 0	7 10 0	
1138	10	Do.	5 0 0	7 10 0	
40000	10	Western (Limited) A, B, & C shares	10 0 0	10 0 0	15¾— 16
20000	10	Do., D shares	1 0 0	10 0 0	2¾—3¼ pm.
16000	5	*West Ham*	5 0 0	9 0 0	7¼— 7¾
10000	5	Do., new shares	1 0 0	9 0 0	1¾— 1¾

APPLICATIONS FOR LETTERS PATENT.

2948.—PETER AITKEN, of the city of Glasgow, in the co. of Lanark, N.B., jeweller, for "*A new or improved gas cooking and heating apparatus or stove.*" Oct. 7, 1872.

2966.—JEAN MARIE TREMAUX, of Alger, and of 37, Boulevard Bonne Nouvelle, Paris, in the republic of France, for "*Certain improved processes of exploring for water, of storing it in the earth, and of regulating irregular sources of supply.*" Oct. 8, 1872.

2968.—ALFRED JOSEPH BERNARD, of 23, Boulevard de Strasbourg, Paris, lamp maker, for "*Improvements in the construction of lamps.*" Oct. 9, 1872.

2976.—WILLIAM DURIE FISHER, of the city of Glasgow, in the co. of Lanark, N.B., engineer, for "*Improvements in apparatus for and connected with the manufacture and use of illuminating gas, parts of which are applicable to other purposes.*" Oct. 10, 1872.

2988.—JAMES YOUNG, of Kelly, in the co. of Renfrew, N.B., gentleman, for "*Improvements in treating liquors containing ammoniacal compounds, in order to obtain products therefrom.*" Oct. 10, 1872.

2990.—RICHARD BAGLEY, of Birmingham, in the co. of Warwick, machinist, for "*Improvements in holders or galleries for the shades or globes and chimneys of gas and other lamps, which improvements are also applicable to candle-holders.*" Oct. 10, 1872.

3005.—CHARLES LOWE, of Reddish, in the co. of Lancaster, manufacturing chemist, for "*Improvements in the treatment of coal-gas tars for the purpose of obtaining certain useful products therefrom.*" Oct. 11, 1872.

3033.—EDMUND ALFRED PONTIFEX and JOHN BARTON, both of the Farringdon Works, Shoe Lane, in the City of London, engineers, for "*Improvements in water-waste preventers.*" Oct. 15, 1872.

3038.—FREDERICK GEORGE UNDERHAY, of Crawford Passage, Clerkenwell, in the co. of Middlesex, for "*Improvements in water-waste preventers.*" Oct. 15, 1872.

3057.—JAMES JOHN SHEDLOCK, of 1, Ellenborough Road, Upper Holloway, in the co. of Middlesex, engineer, for "*Improvements in apparatus for the treatment of hydrocarbon gases and vapours for illuminating and heating purposes.*" Oct. 16, 1872.

3063.—FRANÇOIS RIGOLLOT, of 58, Rue du Faubourg du Temple, in the city of Paris, mechanician, for "*Improvements in sluice-valves for regulating and indicating the flow of fluids, parts of which improvements are applicable to cocks.*" Oct. 17, 1872.

GRANTS OF PROVISIONAL PROTECTION.

1953.—HENRY GIROUD, of Paris, department of the Seine, in the French republic, merchant, for "*A new and improved rheometric regulator for gas-burners.*" June 28, 1872.

2630.—JAMES WILLIAM POLLARD, of 9, Mincing Lane, merchant, JOHN SCHOFIELD, of 37, Mark Lane, merchant, and ALEXANDER BUTEL, of 25, Merchant Street, Bow, manufacturing chemist, all in the co. of Middlesex, for "*Improvements in the treatment of spent oxides of iron for the purpose of extracting cyanides.*" Sept. 4, 1872.

2814.—ROBERT KING, of Wolverton, in the co. of Bucks, engineer, for "*An proved gas-regulator, which may also be used to regulate the flow of water and other fluids.*" Sept. 24, 1872.

2841.—WILLIAM THOMAS SUGG, of Vincent Works, Vincent Street, in the city of Westminster, for "*Improvements in apparatus for regulating the supply of gas.*" Sept. 26, 1872.

2847.—CHARLES WEIGHTMAN HARRISON and ALFRED HORATIO HARRISON, both of High Holborn, in the co. of Middlesex, gentlemen, for "*Improvements in combining atmospheric air and certain gases for lighting and heating purposes.*" Sept. 26, 1872.

2855.—JAMES M'KELVIE, of Edinburgh, in the co. of Mid Lothian, N.B., coal-master, for "*Improvements in the manufacture of illuminating gas.*" Sept. 27, 1872.

2928.—JOHN WEETMAN HICKMAN, of Birmingham, in the co. of Warwick, brass cock founder, for "*Certain improvements in taps or cocks for drawing off fluids and liquids.*" Oct. 4, 1872.

2948.—PETER AITKEN, of the city of Glasgow, in the co. of Lanark, N.B., jeweller, for "*A new or improved gas cooking and heating apparatus or stove.*" Oct. 7, 1872.

NOTICES TO PROCEED.

1656.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*Improvements in metallic packing for making steam, air, gas, or water-tight joints.*" A communication. May 31, 1872.

1671.—JOSEPH BROWN, of Burnley, in the co. of Lancaster, gas-meter maker, for "*Improvements in the construction of gas-meters.*" June 3, 1872.

1687.—ROBERT CAREY, of 5, Radcliffe Villas, Shakespeare Road, Brixton, in the co. of Surrey, for "*Improvements in rotary pumps, applicable also as fluid-meters.*" June 4, 1872.

1720.—PAUL CHARPENTIER, of 17, Rue Vintimille, Paris, in the republic of France, civil engineer, for "*Improvements in apparatus for heating furnaces by gas.*" June 7, 1872.

1747.—ALEXANDER MELVILLE CLARK, of 53, Chancery Lane, in the co. of Middlesex, patent agent, for "*An improved fastening for the lids or covers of gas-retorts.*" A communication. June 10, 1872.

2800.—JOHN THOMAS BROWN PORTER, of the city of Lincoln, civil engineer, for "*Improvements in combined gas apparatus to be used on board ship.*" Sept. 21, 1872.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2932.—ANN BROOMAN, "*Improvements in liquid-meters or apparatus for measuring the flow of liquids.*" Oct. 9, 1869.

2959.—EVERETT AUSTIN SNUGGS, "*Improvements in cocks, taps, and valves.*" Oct. 12, 1869.

PATENT WHICH HAS BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2503.—CHARLES FORSTER COTTERILL, "*Improvements in connexions for and in stopping pipes used for conveying water and gas, and for other like purposes, and in preventing leakages in the said pipes, and in apparatus employed therein.*" Sept. 29, 1865.

Advertisements.

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GAS & WATER ENGINEERS.

CONTRACTORS FOR THE SUPPLY OF

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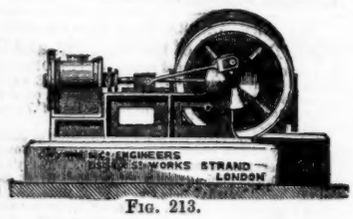


FIG. 213.

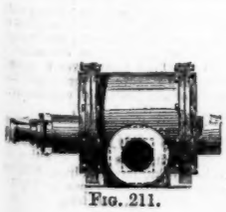


FIG. 211.

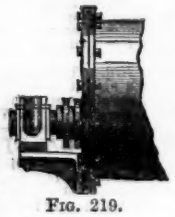


FIG. 219.

GWYNNE & COMPANY,

HYDRAULIC, MECHANICAL, & GAS ENGINEERS,

ESSEX STREET WORKS, STRAND,

London, W.C.,

SOLE MANUFACTURERS OF

BEALE'S IMPROVED PATENT GAS-EXHAUSTER,

Under the personal superintendence of Mr. BEALE.

REDUCED PRICES AND INCREASED CAPACITY.

Also manufacturers of Improved Hydraulic Regulators, to actuate a steam or gas throttle-valve to suit the make of gas; self-acting bye-pass valves, to move by hand or otherwise; improved stop-valves, with faced flanges, forming the neat adjunct to Exhauster of valve and elbow combined. Exhausters manufactured on the new principle have given the utmost satisfaction, and can be seen working at several large Gas-Works in London. G. & Co. are now engaged in manufacturing the largest Gas-Exhausters in the world, with engines complete.

The Gas-Exhausters may be made with inside or outside bearing, as shown in Figs. 211 and 219.

Fig. 213 shows the Improved Gas-Exhauster attached to, and driven by one of GWYNNE AND CO.'s well-known high-speed Horizontal Steam-Engines, without any intermediate gearing. This arrangement is extremely compact, and is beautifully adapted for small or large Gas-Works, and the foundations and erection are both very simple and inexpensive.

Prices and every information upon application to GWYNNE AND CO. *as above.*

DUKE OF HAMILTON'S
LESMAHAGOW GAS COAL.

The superior quality of this well-known Cannel, as wrought by

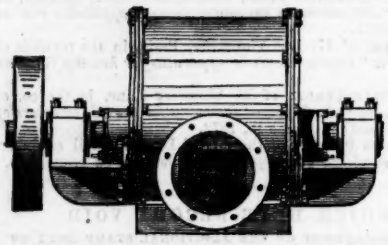
THE NITSHILL AND LESMAHAGOW COAL COMPANY,

Is now generally admitted by all Gas Engineers.

PRICE AND ANALYSIS MAY BE HAD ON APPLICATION TO

JAMES M'KELVIE, HAYMARKET, EDINBURGH.

BEALE'S GAS-EXHAUSTER IMPROVED.



FROM 250 TO 250,000 CUBIC FEET PER HOUR.

Since Mr. BEALE'S retirement, the Oldest Makers are

J. BURTON, SONS, AND WALLER,

MAKERS OF ENGINES, MACHINERY, and IRONWORK for GAS-WORKS.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 inches to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever,
ROTATORY, TUMBLER, and CAPILLARY WATER DISTRIBUTORS for SCRUBBERS.
EXHAUSTERS from 3000 to 30,000 per hour in stock.

HOLLAND STREET, BLACKFRIARS, LONDON, S.E.,

Between Blackfriars' and Southwark Bridges, South Side.

A new Illustrated Catalogue sent on application.

WANTED, two or three experienced MEN who thoroughly understand working Clay Retorts and general duties of Gas-Works. House, coal, and gas provided.

Apply, stating wages required and references, to WILLEY AND FORD, Gas Engineers, EXETER.

YARD FOREMAN.

WANTED, in a large provincial Gas- Works, a YARD FOREMAN. He must be a good mechanic, accustomed to the management of men, and have a thorough knowledge of carbonizing. To a suitable man good wages will be given.

Apply, stating age and particulars of previous engagements, with references, and wages expected, to H. B., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Manager of moderate-sized works (say 30,000,000 or 40,000,000) or FOREMAN in larger works, or in any capacity where a thorough practical knowledge and considerable experience in the manufacture of gas can be made available. The Advertiser has held his present situation for some years, but is anxious to enter upon another where there is greater scope for the improvement of his position. Excellent testimonials.

Address C. B. A., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

RENTAL CLERK WANTED.

WANTED immediately (by the 2nd of November), an experienced young Man as RENTAL CLERK for a Gas Company in South Wales. None need apply unless they possess a thorough knowledge of the duties and routine of a Gas Office, and can produce first-class testimonials as to efficiency and steadiness. Salary £90 per annum.

State present and past engagements, age, &c., inclosing *copies* of testimonials, in candidate's own handwriting, to CAMBRIA, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OVER DARWEN GASLIGHT COMPANY.

WANTED, a Manager for the above Works. He must have a thorough practical experience of the duties of the office, to which he will have to devote the whole of his time; must superintend and assist at the laying of service mains, fix and repair meters, direct the setting of retorts, keep the working accounts, and be a competent draughtsman.

Applications in candidate's own writing, and under sealed cover, with testimonials of character and ability, stating age and salary required, must be sent to me on or before the 11th day of November next. An inspection of the works will be allowed, and any information obtained, on inquiry at the works, but no travelling or other expenses expenses will be allowed.

CHARLES COSTEKER, Clerk to the Company, Over Darwen, LANCASHIRE.

TO GAS COMPANIES.

THE Advertiser desires an engagement as Manager, Secretary, or Assistant Engineer in any works supplying from 20,000,000 to 300,000,000 annually. Good experience, references, and testimonials.

Address MANAGER, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS COMPANIES, MUNICIPAL AUTHORITIES, AND OTHERS.

A Practical Manager, of the highest respectability, 35 years of age, married, and who has been a teetotaller all his life, is open to an ENGAGEMENT from the 31st of March next. Would have no objection to undertake the duties of Engineer and Secretary combined in an English or Foreign gas undertaking. Is acclimatized, and has had 18 years experience—having regularly served his time—of the business in all its branches, both at home and abroad, and was engaged at his own cost some years ago in assisting an eminent Engineer upon experiments respecting a process resembling that patented by Dr. Eveleigh. Understands French, English, and Welsh, and can produce testimonials of merit, good conduct, and respectability, and is moreover conversant with recent gas legislation.

Address P. Q., Thundersleigh Rectory, Rayleigh, ESSEX.

TO PROVINCIAL GAS COMPANIES.

A GENTLEMAN accustomed to superin- tend the Collection and Office work of a large Gas Business is open to a RE-ENGAGEMENT.

Address R. C., Post-Office, BIRMINGHAM.

DRAUGHTSMAN Wanted, to make himself generally useful in an Engineer's office and business.

Address, with age and full particulars, to A. Z., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ANALYSES OF GAS COALS, PHOTO- METRY of GAS, OILS, and CANDLES, and Researches connected with the Chemistry and Photometry of Gas Lighting.

Conducted by DR. WALLACE,
Consulting and Analytical Chemist, and Gas Examiner for the City of Glasgow.
GLASGOW: CHEMICAL LABORATORY, 42, BATH STREET;
GAS LABORATORY, 29, ALSTON STREET.

COOKING AND HEATING BY GAS,
BY
MAGNUS OHREN, A.I.C.E.

NEW AND REVISED EDITION.

Prepared for Gas Companies to circulate amongst their gas consumers.

£1 per 100; £3 15s. per 500; or £6 per 1000.

Address, MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

STATION-METER for Sale, to pass 6000 feet per hour. Is of the best description, and nearly as good as new (by Laidlaw).

Apply to Shotley Bridge and Consett District Gas Company, Green Street, SHOTLEY BRIDGE.

GASHOLDER FOR SALE.

THE Bangor Water and Gas Company have ON SALE a GASHOLDER, 22 ft. diameter by 12 ft. deep, equal to new, at work at Bangor Gas-Works.

For particulars apply to DAVID WHITE, Secretary and General Manager, Bangor Water and Gas Works, BANGOR.

FOR SALE.—A 5-H.P. Vertical Steam- ENGINE, and two 5-H.P. CORNISH STEAM-BOILERS, made by the Reading Ironwork Company; an 8-in. GOVERNOR, with bye-pass and valves complete, by A. Wright and Co.; and a 20,000 cubic feet per hour EXHAUSTER, by Beale, all in good condition, and at present in use. The Engine and Boilers may be had in September, and the Governor at once.

Particulars as to price, &c., may be obtained of Mr. BAKER, Engineer.

Reading Gas-Works, June 15, 1872.

TORBANEHILL MINERAL.

For Sale, by Tender,

FOR WHOLE OR PART,

SEVERAL THOUSAND TONS OF THE

Celebrated Torbanehill Mineral,

Saved from the fire at Torbanehill in June last.

The mineral as it at present lies has been examined and analyzed by Dr. WILLIAM WALLACE, Analytical Chemist, Glasgow, who says:

"Very great care was employed to obtain reliable average samples, and the results show that the mineral is not appreciably damaged."

The results of two testings of fair samples of the Coal give 14,680 cubic feet of 43·7 candle gas.

APPLY TO

MR. DAVID STEWART,

128, INGRAM STREET, GLASGOW.

TO BE SOLD, very reasonably, with immediate delivery, a Wrought-Iron GASHOLDER, 30 ft. diameter by 10 ft. deep. No. 16 gauge plate with cast-iron standards, chains, pulleys, and weights. It is in good working condition, and well worth the attention of any Gas Company to whom the size is suitable.

Apply to the Reading Iron-Works, Limited, Reading, BERKS.

FOR SALE, good as new (having been refitted by a well-known firm), a quantity of 12-in., 10-in. and small sized SLIDE-VALVES. Also two 18-in., one 10-in., and one 8-in. GOVERNORS in good condition. A low price will be accepted to effect a clearance.

WANTED, two PURIFIERS about 4-ft. square, and a STATION-METER to pass 2000 feet per hour.

Apply to JAMES WATSON, Engineer and Manager, Crystal Palace District Gas Company, LOWER SYDENHAM, S.E.

FOR SALE, 18 or 20 Street-Lamp COLUMNS, with tops glazed and all complete. Been in use only four months. Part supplied by J. and S. Roberts, West Bromwich, and part by Lambert Bros., Walsall.

Also 5 D MOUTHPIECES, size 16-in. by 12-in. One set wrought-iron LIDS, and one set cast-iron LIDS, with screws and ears complete.

For terms and to view, apply to the MANAGER, Gas-Works, Brownhills, near WALSALL.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Elland-cum-Greet- land Gas Company are prepared to receive TENDERS for the TAR and AMMONIACAL LIQUOR produced on their works for One or Three years, from the 21st day of November next.

Tenders to be sent to the Gas Office, Elland, on or before the 1st day of November next.

ROBERT WEST, Secretary.

Gas Office, Elland, Oct. 14, 1872.

TO TAR DISTILLERS.

THE Directors of the Plymouth and Stonehouse Gaslight and Coke Company are prepared to receive TENDERS, at per gallon, for the surplus TAR produced at their works for Three years, from the 1st of January next, to be removed from the works as often as required.

Sealed tenders, endorsed "Tender for Tar," to be forwarded to the Secretary on or before Wednesday, the 30th inst., from whom any further information can be obtained.

The Directors do not bind themselves to accept the highest or any tender.—By order,

G. HENDERSON, Secretary.

Gas Offices, Plymouth, Oct. 4, 1872.

TO COKE CONTRACTORS AND OTHERS.

THE Directors of the Gaslight and Coke Company are prepared to receive TENDERS for the purchase of the whole or any part of the COKE which will be manufactured at their works at Beckton, on the river Thames, near Barking Creek, from the 1st of January to the 30th of September, 1873.

Tenders should state the price per chaldron of 36 bushels for delivery free on board barges alongside the Company's wharf at Beckton, or into trucks on the Company's line of railway which communicates with the Great Eastern Railway near North Woolwich. Contractors may be required to enter into a bond, with sureties, for the due performance of their contract. Payments monthly, in cash.

Further information, if desired, may be obtained at this office on application to the undersigned, to whom sealed tenders, marked "Tender for Coke," should be sent on or before Thursday, the 31st of October inst.—By order,

JOHN ORWELL PHILLIPS, Secretary.

N.B.—The Directors do not bind themselves to accept the highest or any tender, and reserve to themselves the right of accepting the whole or any portion of one tender.

Horseferry Road, Westminster, Oct. 4, 1872.

THE GAS-FITTER'S GUIDE (second edition), giving the Principles and Practice of Modern Gas Lighting, Gas-Works, Laying Pipes, Making Joints, Tables to Regulate the Sizes of Pipes for Lights, with a Sheet of Drawings; 24 stamps, post free.

G. ELDRIDGE, 54, Murray Street, HOXTON.

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In Memoriam.

The following particulars as to the life of the late Proprietor and Editor of this Journal will probably be of interest to the large number of its readers who were personally acquainted with him.

Thomas Greaves Barlow was born on the 10th of January, 1811. His family was of some antiquity, as his ancestors are traced to have lived, from the fifteenth to the seventeenth centuries, in the village of Great Barlow, near Chesterfield, where some of their tombs in the church are still preserved. One of the family, Thomas Barlow (or Barley, as it was sometimes spelt), was the first of the three husbands of the celebrated Countess of Shrewsbury, "Bess of Hardwick."* Some generations ago a branch of the family settled in the neighbouring town of Sheffield, where John Barlow, the father of Thomas, was born, and resided during the early part of his life. He was intended for a mercantile business, but, having a preference for mechanical pursuits, he, in conjunction with some relations, established an iron-foundry in Sheffield, which he carried on for some years.

When the use of coal gas was first successfully introduced into London, in 1813, Mr. John Barlow took great interest in the subject, and a few years afterwards he formed such a high opinion of the prospects of the new invention, and of the opportunity it offered for mechanical enterprise, that he gave up his works at Sheffield, and removed to London, where he devoted himself energetically to the design and construction of gas-works, and to the perfecting of the apparatus employed therein. He established a manufactory in the City Road, and aided materially in the introduction of the new light in various parts of England. He was, in fact, one of the earliest "gas engineers," and although his name has not been associated with any prominent invention or improvement, yet it is well remembered that his skill and care in the construction of apparatus conduced in no small degree to the commercial success as well as to the public utility of many of the earlier undertakings for gas supply.

Thomas was the third of eight sons. After receiving a useful practical education at a private academy, he, at the age of sixteen, entered his father's office, and from that time his connexion with the gas world was unbroken to the day of his death. After some years pupilage, he was, with a younger brother James, taken by his father into partnership, and the gas engineering business was thenceforward carried on under the name of John Barlow and Sons. The firm had offices in Bucklersbury, where the designing, drawing, and consulting business was carried on, and the workshops in the City Road were enlarged, and used more extensively for the practical execution of the works undertaken by the firm.

The chief part of the work devolved on Thomas, who, during the time he was connected with the firm, designed and constructed numerous gas-works, not only in Great Britain, but in many other parts of the world. In 1835 he went to America, where he stayed two years, and superintended the building of gas-works in several rising towns. He also visited many parts of the continent of Europe, and was extensively engaged there in the same objects.

John Barlow the elder died in December, 1838, after which time the business was carried on for about ten years longer by the two sons.

At the beginning of the year 1849, Mr. Barlow established the Journal of Gas Lighting. About that time considerable agitation had been raised against the gas companies of the metropolis, and especially against two of them, the "Chartered" and the "City" Companies, which jointly supplied the City of London. Several influential members of the Corporation, headed by the late Mr. Charles Pearson, the City Solicitor, had promoted a new company, called the "Great Central Gas Consumers Company," the object of which was to supply the City with gas at four shillings per thousand cubic feet instead of six shillings, the price then charged. So great was the alarm of the old gas companies of the metropolis at this threatened competition, that a panic took place in the gas share market. From January, 1848, to January, 1849, the average fall of the shares was 20 per cent., and a few months later, as

* This lady was a historical character; her second husband was a Vernon, of Haddon Hall, and her third a Talbot, Earl of Shrewsbury. She has acquired the name in the text from having built, in Elizabeth's time, the grand old seat of the Duke of Devonshire, Hardwicke Hall, near Chesterfield, which still remains intact, exactly as left by her.

the proposal became more strongly supported, and obtained more favour in the eyes of the authorities, many holders of metropolitan gas shares rushed into the market to sacrifice their property at prices in some instances as low as 80 per cent. under the paid-up capital. The companies were terrified at the popular cry for cheap gas, which they believed foreboded nothing less than entire ruin to them. Mr. Barlow, who had paid great attention to the progress of the agitation, saw at an early period the fallacy of the panic, and the desirability of making some efforts to arrest it; and he resolved, in conjunction with some influential friends, to establish a journal, with the view of supporting the interests of the existing gas companies, as well as of circulating scientific and commercial information on the subject of gas lighting generally.

The first number of this periodical bears date Feb. 10, 1849, and, in size and general arrangement, it has undergone little alteration to the present time. At first it appeared only once a month, the bi-monthly issue being adopted at a later period, when the increasing interests of gas affairs, and the addition of "Water Supply and Sanitary Improvement" to its scope, rendered a more frequent publication desirable. It was announced openly as "Edited by Thomas Greaves Barlow, Civil "and Consulting Gas Engineer," and, although afterwards the name was omitted, it was always well known that the entire responsibility of the conduct and the contents of the JOURNAL rested on Mr. Barlow alone.

In the earlier numbers he strongly opposed the formation of the new company, but the opposition was unsuccessful, and, as is well known, the Great Central Company became established, and supplied a large quantity of gas in the City. Mr. A. Angus Croll, their engineer, engaged to produce gas for them at a certain price; but, on the termination of his contract, a dispute arose between him and the company as to a considerable sum claimed, and, although Mr. Barlow had strongly contested Mr. Croll's views and statements at an earlier period, so great was this gentleman's confidence in Mr. Barlow's experience and integrity, that he appointed him as his arbitrator—a compliment which Mr. Barlow always spoke of with much gratification.

It was Mr. Barlow's avowed policy to advocate in the JOURNAL the interests of the gas and water companies, so far as their proceedings were creditable and just. But he would never give support in its pages to measures of objectionable character, or which he conceived would not tend to the credit of their promoters. He was never slow to point out errors of policy on the part of managers or directors, and it was always one of his fixed principles earnestly to advise conciliation of the public, when it could be reasonably offered without material detriment to the interests of the shareholders. This unflinching line of conduct sometimes produced temporary dissensions, but it was favourable in the long run to his own interests, as it procured for the JOURNAL an eminently independent character, and won a high degree of confidence for the opinions expressed in its columns. He never failed to urge on the companies any line of policy which, though it might not always be palatable, he conceived would be to their real advantage, and would ultimately secure them the support of the public. In the first number, for example, he endeavoured to show that the proper way to meet the threatened competition was by an extensive measure of amalgamation, which would enable the companies, without loss to themselves, to make reasonable concessions to the public, and so to cut the ground from under their opponents' feet. He gave a somewhat lengthy statement of his views as to such an amalgamation, and shortly afterwards he renewed the proposal in a printed letter to the Earl of Carlisle, then first Commissioner of Woods, &c. Ten years later, during the discussions which preceded the passing of the Metropolis Gas Act, 1860, he addressed a letter to the Right Hon. Sir G. C. Lewis, then Secretary of State for the Home Department, on the same subject, in which the details of the necessary arrangements of an amalgamation were worked out in the most careful and elaborate manner. The scheme did not, at the time, obtain the support of the companies, but they were afterwards compelled to make the concessions without realizing the corresponding advantages comprehended in his plans. It is only within the last few years that the wisdom and forethought of Mr. Barlow's views on this subject—uttered so long ago—have been fully recognized. Amalgamation of the metropolitan companies has not only been sanctioned and recommended by Parliament, but has already been largely carried out; and in all probability, before many more years are passed, it will become more comprehensive still.

While working energetically for the companies as corporate bodies, he was not unmindful of the personal interests of the officers engaged in their service, particularly those in the engineering and manufacturing departments. He was always accessible to the humblest individuals engaged in gas-lighting operations, and was ever ready to give them such advice and help as he conceived would be most useful to them; and he took an active part in promoting any combined measures for the advantage of officials, such as the formation of scientific associations, benefit societies, &c., among them.

Mr. Barlow took great pride in the JOURNAL after its success was established. He performed his editorial duties with great industry and zeal; to within a few months of his death the "Circular to Gas Companies" was either written or suggested entirely by himself, and the whole contents of each number received his careful general supervision. What the result of his labour was, need not be said; but it is very doubtful whether any parallel instance exists of a periodical, in so limited a sphere, which, being established, owned, and edited entirely by one man, has achieved so wide and so high a reputation as the JOURNAL OF GAS LIGHTING.

After the establishment of the paper, Mr. Barlow entirely gave up the manufacturing branch of his former business, and greatly diminished that of the design of works. He still occasionally prepared plans for gas establishments, and superintended their execution; but he preferred to confine his practice to that of a consulting gas engineer—advising with gas companies and their officers on their general arrangements, constructions, processes, and operations—making valuations of gas property and interests—undertaking arbitrations in cases of dispute—investigating scientific points of practice—giving evidence in legal and parliamentary cases, and so on. In this branch of the profession his practice became very large; from his great experience, his extended reputation, his sound judgment, his high position, and his upright character, his aid was eagerly sought, not only in his own country, but in all parts of Europe, and frequently in the affairs of more remote quarters of the globe. An attempt has been made to procure a list of the places where his services have been engaged, but, though still incomplete, it became so large as to be inadmissible in a brief notice like the present. The object may be better attained by saying that there are very few gas establishments of magnitude with the business of which Mr. Barlow had not been connected in some way or other.

In private life, Mr. Barlow was much esteemed by a large circle of friends, who were, however, chiefly those connected with gas matters; for, although his means were ample, his disposition and habits were unobtrusive, and he did not seek largely to enter into the vortex of what is called general London society. With the chief engineers and scientific men connected with gas matters he was always on the best terms, and the professional controversies in which he was, as a matter of business, often opposed to them, were never allowed to interfere with the amenities of their pleasant private intercourse.

Mr. Barlow's health had been gradually failing for some years. In June, 1872, he proposed to "take two months' complete rest, "and escape from the worry of business, beyond the reach of "telegrams." He thought of St. Moritz, in the Engadine, but he could not accomplish this, and spent some time at Saltburn-on-the-Sea, whence he removed to Boulogne. Finding himself growing worse in health, he attempted to reach home, but was obliged to stop at Folkestone. There he rallied a little, and one day he was induced to pay a visit to the gas-works, which he had himself erected, and which, indeed, were the last works constructed from his designs. The exertion proved too much for him; he sank rapidly, and on the 6th of September he passed quietly away. It was a touching illustration of his kindliness of disposition, that the last words he uttered were expressive of private sympathy with friends whose affairs had lately come under his notice.

The body was removed to his residence, 5, Delamere Terrace, London, and the funeral took place at Kensal Green Cemetery, on the 12th of September, in the presence of many sorrowing friends.

Mr. Barlow will be long remembered for the aid he has given to gas lighting, and there is no place in which this aid may be more appropriately acknowledged than in the columns of the JOURNAL which, for nearly a quarter of a century, has been upheld and guided by his able hand.

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

J. H. W.—*The whole question depends upon the provisions of the Companies Act if it is an incorporated company, or upon its Articles of Association if it is a company registered under the Joint-Stock Act. There is no general law on the subject.*

The Accident to a Gasholder at Oldham.—*Mr. J. P. Ruddock, superintendent of the new works for the corporation at Oldham, requests us to state that he was not the person under whose management this accident occurred, as was stated in our report at the time.*

Dr. Letheby on the Sanitary Legislation of 1872.—*We have received proof sheets of the address delivered by Dr. Letheby on this subject before the Metropolitan Association of Medical Officers, which we hope to give in our next.*

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, NOVEMBER 5, 1872.

Notes upon Passing Events.

The Association of Medical Officers of Health held a meeting on the 28th of October, and agreed on a report, which contains "suggestions for the effective working of the Adulteration of "Food Act of last session." They recommend that the several analysts appointed by vestries and district boards "should work "together on some pre-arranged system;" with this end—that all the work of analysis shall be done in at most two laboratories, in which skilled assistants shall be constantly at work, under the uperintendence of the appointed analysts. They state that ccording to the experience of Dr. Letheby, Professor of Chemistry in the London Hospital, and Dr. Stevenson, the Lecturer on Chemistry at Guy's Hospital, the work under the Act will require a contribution from each vestry or district board of the metropolis of from one hundred to two hundred pounds; that without a sufficient outlay the committee are of opinion that the working of the Act will lead to the puffing of some tradesmen and manufacturers and the persecution of others. They further recommend that the appointed analysts shall be debarred from giving any certificate of purity for advertising trade purposes, and that the "inspec-"tors" shall be under the control of the analysts. This plain-speaking report will bring the sincerity of the local authorities on the question of adulteration to the test, and it will calm the fears of those who expected that the Act would work for the benefits of advertising speculators like those who are now covering the walls with praise of a tea spirit which may be made of potatoes, or barley, or beetroot, but has not a particle of tea in it beyond a faint flavour. The necessity and the difficulty of enforcing sanitary regulations on a population that makes money out of putrefaction has been recently amusingly illustrated at Bishop's Stortford, whose kings are maltsters. Maltsters require cart horses—cart horses make dung. It is more profitable to cart dung away once a year, when farmers want it on their land, than once a month or once a week. The other day the Board of Health of Bishop's Stortford, moved by the complaints of inhabitants to whose weak lungs the pungent ammoniacal flavour of dung heaps was offensive, made an order that there should be a weekly clearance of all stable refuse. Upon this the maltsters brought their pressure to bear on the doctors, and they all signed a sort of round robin to the effect that so far from horse dung being injurious, it was one of the wholesomest things in the world for the consumptive or asthmatic patients of Bishop's Stortford to smell and breathe! We look forward to the report of the next meeting of the Bishop's Stortford Board of Health with anxious pleasure.

The Metropolitan Board has commenced another game of *picquet* with the Corporation of London, and scored the first trick. The Board, after wisely considering the question long in secret committee, has determined to take up the operation of buying up all the toll bridges between Blackfriars and Richmond. To do this they will apply to Parliament, and propose to employ the coal and wine duties as soon as they are freed from present liabilities. The representatives of the City of London at the Board alone held up their hands against the plan, and Mr. Lowman Taylor, for the Corporation, indignantly protested against this *stalemate*. The learned and brutal Chief Justice, Lord Ellenborough, in answer to an aggrieved and discharged prisoner's threat to protest, told him to "protest and go about his business." This is all that is left for the venerable Corporation to do. The public want free transit over Waterloo, Hungerford, Vauxhall, and the other more obscure bridges; and when the Metropolitan Board offers to undertake the job which the Bridge House Estate, with all its dignified and well-paid functionaries, has neglected, the public will ask no questions as to where the money is to come from, or how it is to be raised. "Barkis is willin';" or, as Sam Weller said to Mr. Pickwick, ignoring all other parts of his harangue, "You offers me half a guinea—I accepts." Common Councilman and Publican Rudkin, when he does not hate any one, and is not diplomatizing an arrangement for getting something for himself out of the Corporation, says true, rude, sensible things, and never truer than when he advised the Common Council, all cackling with indignation at the last laid Metropolitan egg, "to cease protesting against what they could not resist." If the Corporation could suddenly discover, in its mysterious finances and boundless credit, the means of freeing the toll bridges, without mortgaging wine and coal duties, the metropolitan public, with perfect equanimity, would see them out-trump the Metropolitan Board. The Corporation has gained enormously in public opinion, within the last ten years, by its works; its talk never permeates beyond the circle of the *City Press*—a respectable but limited constituency. The Holborn Viaduct; the Blackfriars Bridge, in spite of its hideous stumpy columns; the new markets; the asphalte in Cheapside and elsewhere; the sanitary arrangements, the best in Europe; the honest fight to save Epping Forest; and, last, the construction of a really creditable Library—these speak trumpet-tongued, when all the forms and ceremonies, and windy talk, and gas illumination, and other miserable jobs, only excite disgust and contempt.

Whenever we hear of a philanthropic scheme connected with land, we are depressed by the most unworthy suspicions. *Ecce iterum Crispinus!* Mr. Frank Fuller, the most irrepressible of land jobbers, is busy again with a new combination for turning the acres of Alexandra Park into cash and a commission, and all in the name of the sovereign people. For full twelve years has he plied the labouring oar of *prospectus* with very partial success. That Alexandra Park is a very charming spot nobody can deny. That it is most desirable to keep open to the public, at some low price—say twopence, or at most sixpence—these few hundred well-wooded undulating acres, and thus create a wholesome rivalry with the Welsh Harp, the Rye House, and other suburban places of recreation, is very true. But in additional shilling shows we do not believe, for eighteenpence is not the real working man's price, except at rare intervals. Why should we subscribe to set up a rival to the Crystal Palace and North Woolwich Gardens? Flower shows and archery meetings have been tried at Alexandra Park without success; and baby and barmaid shows will follow in due course, when the funds can be raised for opening the doors of the Palace, which Messrs. Lucas, the contractors, obdurately keep closed until their little bill is paid. What has a racing meeting, with a shilling gate money, to do with the amusements of the working men of London? If that is wholesome for them, they can go to Hampton, and Harpenden Common, and Willesden, and Croydon, and have nothing to pay beyond their railway fare. It is natural and creditable that Sir John Gibbons should wish to link his expiring glories with some permanent monument of his benevolence; and what more suitable than the big building that has been standing in silent grandeur, hideous but capacious, on the hill overlooking a lunatic asylum on the Great Northern line. Everybody is asked to gain immortality by guaranteeing a hundred thousand pounds for Alexandra Park—the latest scheme since Mr. Fuller's celebrated one pound a-head tontine, supported by all the financial force of the author of Lloyd's Bonds, collapsed horribly. Even hawking—hawking pigeons on five hundred acres! one might as well try to run the St. Leger on a croquet-ground—did not succeed in raising the wind. "Rob me, if you please," said the Russian prince to his *chef*, "but let me have the best dinner "in Paris." So we would humbly say to the last edition of Alexandra Park promoters schemes—"Drop your philanthropic "cant, and tell us how much you want for your bad bargain."

Under which king, Benzonian?—speak or die.

Are we invited to subscribe to save something out of the fire for Lucas Brothers, worthy, liberal, and respectable people? or is it the London Financial Association, with the King of the Greeks at its head, that wants our charitable contributions? Great is the influence of Lord Mayors, especially when they are also baronets; but the public, who do not entirely forget Mr. Frank Fuller's failures in his Crystal Palace and Caterham land speculations, hesitate when they hear him for the third time trying to float off Alexandra Park as a philanthropic investment, and cannot help recalling the cry of the mountebank—"Twopence more, and up "goes the donkey."

The people of taste in the metropolis, few though they may be, have been sorely tried by statues in bronze and marble—George IV., in a blanket, taking his horse to water, in Trafalgar Square; and, at the Royal Exchange, the Duke, similarly employed, or in his cocked hat, making hideous the arch on Constitution Hill; George III. mesmerizing the passers-by at Charing Cross with his pigtail; and a score of other monstrosities, make one ashamed to walk out with an intelligent foreigner. Another of these dreadful things is to be added to the artistic horrors of London—an equestrian statue of Prince Albert is to be placed on a two thousand pound pedestal

on Holborn Viaduct. We sincerely condole with the architect of that imposing and useful structure. There will be more to follow, no doubt of the same class—more Bacons, more pig upon pork. Prince Albert was a good and accomplished man, although not quite the miracle of taste and virtue which parasites make out; but he never did anything to deserve the fearful caricatures set up at Wolverhampton, at Liverpool, and now in the City of London.

The newspaper philosophers of the *Spectator*, the *Daily News*, and the *Echo*, have recently had brought home to them what they might expect if the officials of the Post Office—their *beau idéal* of administration—controlled the railways; and if the railways, why not the bakers shops? for daily bread is more important than locomotion, and post-masters might easily sell loaves as well as stamps. Mr. Tilley, of the Post-Office, has been teaching the publishers of the *Bristol Mirror* their business. The *Bristol Mirror* is a very old, highly respectable, and successful provincial newspaper; being successful, it has a great many advertisements—the last and soundest sign of newspaper prosperity, Mr. Tilley hesitated to register the *Mirror* as a newspaper to be "sent by "post," because he does not consider advertisements, news, and he desires the editors to mend their ways, and take care in future the advertisements do not overlap the columns, which alone Mr. Tilley considers to be entitled to the name of news. Mr. Tilley's Post-Office official duties have evidently not led him to examine one of those wonderful numbers of *The Times*, where an eight-page supplement is filled with advertisements.

A paragraph, going the rounds of the papers, reports of Great Grimsby, October 25, that—

> The quay-room at this port is completely covered with bales of foreign merchandise, thousands of bags of potatoes and grain. Indeed, there is a regular glut of traffic. The Anglo-French steamers bring in about 300 tons of sugar every week from Dieppe, and large cargoes of potatoes. Greater facilities will have to be afforded to meet the wants of a rapidly-growing commerce. The clamour amongst all parties interested is for increased quay and dock room and more trucks.

Will any *doctrinaire* philosopher be bold enough to assert that the accommodation of the port of Grimsby is not a national advantage, or that any Government within the last thirty years would have dared to sink a million in constructing thosecapacious docks? Grimsby Docks were one of the offshoots of that very unfortunate investment, the Manchester, Sheffield, and Lincolnshire Railway. The dock shares for years bore only a nominal value. As Government work, they would have been the perpetual blister of any rash Chancellor of the Exchequer. Our wise desk philosophers would take possession of all the plums of private enterprise, and leave no opening for such boons to commerce as the docks of Southampton and Grimsby.

Sir Sydney Waterlow is evidently not going to be merely a "dining Lord Mayor." Any stupid fellow, with the City's cash to spend, and a little of his own, can be hospitable, Messrs. Ring and Brymer assisting. Sir Sydney has brought forward the question of establishing a Tribunal of Commerce in the City of London, and suggest a court composed of some eminent lawyer, assisted by two mercantile assessors—an arrangement which has long worked successfully in the ancient commercial city of Hamburg. If the City Corporation is willing to try the experiment, it is to be hoped that no narrow jealousy on the part of legal or other functionaries will impede it. Perhaps the opportunity might be taken of assimilating the cumbrous forms and tiresome juries of the Lord Mayor's Court to the practice of the county courts. The City is at present, with a Recorder, a Deputy-Recorder, and Commissioner Kerr, overburdened with judicial power. Sir Sydney Waterlow may perhaps contrive to utilize some of the "waste "steam."

Dr. Lankester is very angry because, at a meeting of Middlesex magistrates, attention was called to the excess of his expenses over another metropolitan coroner. Dr. Lankester should esteem himself very fortunate that he holds a freehold by the grace of the electors of Middlesex. His recent appearance in the Bankruptcy Court, and his connexion as a director of joint-stock companies, should recommend him to a discreet silence.

Mr. Deputy Stapleton has given notice of a motion—"That "the Corporation of London should set up floating baths on the "Thames *as soon as the main drainage of the metropolis is com-* "*pleted.*" The last proviso is prudent. The last time we took a swim in a floating bath on the river Seine (it was during the Imperial reign), we were obliged to go on shore for another bath of warm water to wash off the mud and sewage of the Parisian river. Something in the way of free or penny baths is needed, now that London has grown so large and the inhabitants so modest. In hot weather it is quite distressing to a well-regulated mind to see policemen engaged in chasing the dirty, ragged little boys, who for once in a way are endeavouring to add cleanliness to godliness.

The usual announcement of the delivery of lectures for Michaelmas term, in Gresham College, has appeared. Has no one any power to stop and utilize this dreadful sham in the way of instruction? If the funds of Gresham College were diverted to establishing a free library, or a working laboratory and institution in chemistry at low fees, or if they were turned into a certain number of scholarships for the benefit of the City schools, some good would be derived from this ancient bequest. Why should not the parties who are trying to galvanize the dry bones of the Livery Companies into real assistance in technical education, also take the Gresham Estates in hand? A meeting of the members of the Livery Companies was held the other day to consider this question. Of the twelve great companies, only the Merchant Tailors was represented; the others were Ironmongers, Tallow Chandlers, Saddlers, Painter-stainers, Glass-sellers, Cordwainers, Wheelwrights and Pewterers. The members only came in their private capacity. It was proposed that a premium of £20 should be offered to the pupils of twelve selected evening schools, for the best essay on scientific construction. Immediately the voice of the City Mrs. Gamp, in the person of a Mr. Harris, was heard suggesting that the prizes should be confined to the members of the guilds represented. Considering that nine out of ten of the Livery Companies have nothing to do with the handicrafts whose name they bear, this was a retreat into the dark ages. A more sensible proposal was to give a premium for drawing, and this was modified into a plan of prizes for drawing and science applied to trade and manufactures. Mr. Saunders made the astounding statement that the guilds were "still useful,"—most people outside the City think them mischievous—"for charity and hospitality." The liverymen who wish to do something, missed the fact that it is not mere competitive prizes which are needed; they are awarded, and nothing more is heard of the prize-winners. What is needed in the working districts of London, in and out of the City, are institutions and superior teachers, partly paid by salaries, and partly paid by fees, where the workmen who have passed through elementary schools may learn thoroughly (if they choose) with all the expensive appliances in books, models, &c., the arts and sciences which are useful in trade and manufactures. Nothing is more nonsensical than the idea of a school for carpenters or saddlers; such trades must be learned in real work, by instruction and imitation. Public opinion ripens very fast in these days, and unless the Livery Companies find something better to do with their vast funds, than electing pertinacious paupers to almshouses, and giving dinners, with all the delicacies of the season, to each other—sometimes at halls built and decorated at shameful expense, and sometimes at the Albion, the London Tavern, the Star and Garter, Richmond, or the Ship, at Greenwich—they will awake some fine morning and find a Minister of Education and Charity with a Bill cut and dried for disestablishing them as summarily as the Irish Church.

The licensed victuallers find themselves in a new position as regards their customers. Formerly, their policy was to ignore or conceal the drunkard—as long as he did not interfere with the quiet topers he might do as he liked—now, in self defence, for fear of being punished as *particeps criminis*, each publican co-operates with the police; consequently there are more detections, more arrests, and, as the magistrates punish in earnest, instead of sending the penniless drunken vagabond away when he could not find five shillings, more committals to prison. As a consequence, the organs of the tap-tub interest are professing to rejoice greatly over the increase of crime, created, as they say, by the new Licensing Act. As a matter of fact, drunkards who went unpunished before are now punished; in a short time we shall learn whether lessened facilities for drinking, and greater certainty of punishment for the riotous, does or does not diminish a notorious evil; if it does, it is well worth some preliminary expense in prison food and care. According to the publican's theory, the establishment of a regular police increases crime. When Peel's "Bobbies" superseded the old "Charlies," arrests were enormously multiplied, and lock-up houses were filled by criminals who previously passed unnoticed.

All statistical evidence is in favour of the theory that within the last quarter of this century a serious inroad has been made on crime and pauperism. The latest accounts show, as they ought, that the pauperism of the metropolis, in spite of the temptations offered by some hundred undiscriminating charities, is about one-half that of Paris; besides which, London is free from the curse of the Parisian "dangerous classes." If it were not so, our free institutions, the spread of education, the active intelligent exertions of private charity, and the more sagacious application of poor-rates, have done nothing for us. But in continental States it is the rule to repress any outward visible sign, and also any publication of anything disgraceful to the State. French soldiers rotted in the hospitals of the Crimea; but to have published the fact would have been treated as a crime by the Government, and considered unpatriotic by "the nation." For real croakers—for men who seem to despair of the future of the commonwealth—we must turn to such learned dignitaries of the Church as Canon Gregory.

He does not see that soap and water are cheaper and more commonly used; that whole new clothes have superseded the rags and the second-hand garments of the artisan of 1825; that the gentlemen of Lancashire, with an earl at their head, no longer challenge the gentlemen of Cheshire to fight a main of cocks at five hundred guineas a side; that bull-fighting and pugilism are no longer the Sunday amusements of the still ill-educated colliers of the Staffordshire Black Country; that churches, chapels, schools, and reading-books for the million swarm over the land; that respectable shopkeepers—we are still speaking of the first quarter of this century—no longer resort to taverns night after night to hear indecent songs and retail obscene jokes; that the aristocracy are more refined, and that they no longer consort with prizefighters, and borrow their familiarly blasphemous language. A master of hounds who cursed his servants and his field like notabilities of the time of even King William IV. would soon have no field to curse. The proverb "drunk as a lord," once a veritable axiom, no longer applies. An aged Congregational minister, taking leave of his flock the other day after a pastorate of nigh half a century, saw the modern condition of English society in this light. Although—

> There be cake and ale, and ginger hot in the mouth, too,

there is a great deal to be thankful for. But good men of the Canon Gregory class are so vexed to find the decline of their *authority*, that they lay down a view of history only consistent with Dr. Cumming's prophecies. If the end of the world is going to take place about the time of the end of Dr. Cumming's lease, the general deterioration of all classes of society and approaching destruction of everything will culminate in an extinction of the world by the shock of an erratic comet.

The vexed questions of the condition of the agricultural labourer and the game laws, have lately been treated in a very decided manner by a Conservative M.P., who would hotly disclaim the character of a professional politician, a political philanthropist, or a Radical reformer; and yet his utterances are of a plain-spoken character which must utterly confound some Norfolk squires and Scotch game-preserving lords and lairds. Mr. Gerard Sturt is Conservative M.P. for Dorsetshire, the grandson of one earl, the son-in-law of another, a notability on the Turf and in the hunting-field, the resident owner of a very fine estate, and a few years ago essentially a "swell of the period." He has sat in Parliament for five-and-twenty years, and is now only forty-seven years old. Mr. Sturt said:

> This year he had been on a committee on the Game Laws, and he had no hesitation in saying the grievances came mostly from Scotland, and that many who gave evidence had a great deal to complain of. He had come to the conclusion that it was impossible for a man to do credit to his farm where game was over-preserved. (Applause.) And he believed that if it were not for half-a-dozen potentates, as he might call them, in Scotland—he would not mention their names—who over-preserve game and do things of which they ought to be ashamed, we should have no agitation about the Game Laws, although there was one thing the English tenant farmer would like to see remedied. In 99 cases out of 100 the tenant was pleased for his landlord to come and have a fair day's shooting, but he did not like to be eaten up by ground game. (Much applause.) And, what was worse, he did not like—and if he were a tenant farmer he would not stand it—for the landlord to let his place and the shooting to a stranger, and for Mr. This or my Lord That to come down, preserve hares and rabbits, shoot them, and in many cases send them up to London to be sold. That was an outrageous state of affairs, and demanded the interference of Parliament.

Now, when Mr. Peter Taylor, M.P., the garotters friend, says such things, we know that he despises field sports, and hates landed squires almost as much as the supporters of the Contagious Diseases Act; but when an aristocrat, a squire *pur sang*, and a man of fashion, speaks out, it is certain that rational reform is at hand.

> Turning to the labour question, which had great interest in Dorset, on account of the operations of the National Agricultural Labourers Union, he said he should speak out his mind upon it. If he did not he should not be worthy of being their representative, and he should be ashamed to be a landlord. He thought they ought not to be astonished or annoyed that the Dorsetshire labourer should have asked for an increase of wages when he learnt from the newspapers that the mason, the carpenter, the blacksmith, and even servants had been advanced. Besides, changes had occurred in agriculture, and they used steam ploughs and other implements unknown 20 years ago, and requiring skilled labour. Therefore, he was not surprised the labourers asked for their wages to be raised, and he would say more—that the condition of the peasantry throughout the south of England required considerable improvement. . . . But he believed this question of labour was mainly a landlord's question, because if the agitation went on tenants would leave their farms, and he should have to lower his rents, which he did not like. The other morning he drove to Euston Square Railway Station, and at nine in the morning saw Mr. Gladstone there, got into a carriage with him, and had a pleasant journey in his company as far as Rugby. Although Mr. Gladstone knew he was a Conservative, and whenever he had the chance voted against him, anybody more affable or possessing such a fund of information he never met in his life. He said to himself, "Now I'll run him a trial on this labour question," and, taking an opportunity, put the matter before him. Mr. Gladstone replied: "I think it is a question of supply and demand, and in a few years will settle itself;" but he told him that Mr. Tollemache, when he came into his property in Suffolk a few years ago, found the labourers and farmers always at war, and set himself to change such a state of things. He built enough cottages on each farm for the labour on it, and set out allotments. The happiest results followed, and farmers and labourers became in complete harmony. He thought it the bounden duty of landlords to provide sufficient cottages and allotments. He had ordered four to be built at Forston, and should call them "Gladstone Row." He had a crotchet—he knew it was very unpopular—to keep the cottages in his own hands, instead of letting them to the farmers, but he stipulated that the occupiers should work on the farms to which the houses were attached, so that he thought the tenants had nothing to complain of.

Mr. Gerard Sturt has never, like the Duke of Marlborough, appeared as a noble luminary on a Church Missionary platform; he would not be specially selected to meet a party of bishops and cathedral dignitaries, but his observations may do much to calm the irritation caused by the remarks on the same topic by the pious Duke of Blenheim and the Right Reverend Father in God the Bishop of Gloucester. Of course Mr. Sturt abused agitators, whom we none of us like, and all employ when we want to agitate. There was a time when squires and farmers cheered and paid agitators—some travelling lords, others deep-lunged auctioneers; and has not *Punch* immortalized that guerilla chief, the dead or silent Chowler?

Circular to Gas Companies.

We report at some length the proceedings at the meeting of the gas stokers of the metropolis, held on Wednesday last, and it is only right to say at once that they do the men infinite credit. The agitation, as now explained, is to obtain as far as possible the abolition of Sunday labour. A hint is thrown out as to some ulterior object to be aimed at in the future, which is not difficult to guess, but for the present the demand of the men is for the cessation of Sunday work. Readers of the Journal of Gas Lighting know well the support this Journal has always given to the movement, inaugurated, be it remembered, from purely religious and philanthropic motives, by some managers of gas-works in the metropolis, and not by the men, and will understand that this agitation, so far as its object is here defined, has our hearty sympathy. Unfortunately, the conditions in most of the metropolitan works are such as will not allow of any great diminution of Sunday labour. The manufacturing capacity is barely equal to the continual demand for gas at this time of the year, and retorts must be kept at work, but wherever it is possible the men may rest assured that the companies will be only too happy to adopt such arrangements as have been suggested, and to a great extent carried out, by Mr. G. Livesey, Mr. Morton, and Mr. Woodall, at their several works, and give the men a portion of every Sunday, and a whole day's rest as their turns come round. Let us hope that the leisure so gained will be devoted to the objects for which it is claimed.

We are glad to receive again a distinct assurance that nothing like a general strike is contemplated by the men, and need not now point out the disastrous results which would ensue. We are satisfied that all that can be legitimately demanded on the one side, and can be reasonably conceded on the other, will be gained by frank intercourse between masters and men, such as has recently taken place with the men and directors of the Imperial Company. We sincerely hope that the recommendations of one speaker (Mr. Barker) will be strictly adhered to, and that the men will allow no outside paid agitators to step in between them and their employers.

Last week the public of Macclesfield were gratified with the sight and sound of two notorious characters—the Tichborne Claimant, and Mr. George Flintoff, C.E. The former, of course, went "to raise the wind;" the latter upon invitation, and, probably, after prepayment, to assist in raising a storm against the management of the Gas Committee of the Corporation. Mr. Flintoff wished, as he is reported to have said, to make his hearers "wiser and better"—he might have added wiser by giving them the most meagre information, and better by setting them an example of singular untruthfulness. He claims to have reduced the price of gas in 223 towns of Great Britain. It may be, for aught we know to the contrary, that the price of gas has been reduced in such a number of towns subsequent to a visit from Mr. G. Flintoff, but there may be as much connexion between the two events as between the erection of Tenterden steeple and the formation of Goodwin Sands. In other statements the lecturer was less fortunate. He stated that he had visited Inverness on the previous Wednesday, and had knocked off the aristocratic sum of 2s. 6d. per 1000 from the price of gas. This assertion attracted the particular attention of the editor of the *Macclesfield Courier*, who telegraphed to Inverness to know if it was true, and received an answer from the town-clerk to the effect that he knew nothing of a reduction, but that the price of gas had recently been raised 2s. 6d. If we add to this the gross libel on gas managers, who "were as a rule," Mr. Flintoff said, "men "who could neither read nor write," we might dismiss the lecture from further notice. It is possible that many other gross mis-statements, printed in the report we read, are mistakes of the reporter. Our readers know that we are no friends to corporate management. We have always held that private enterprise can and does supply towns with gas as well and as cheaply as a Corporation or Local Board can. We have not the accounts of the Macclesfield Local Board before us, and therefore are unable to say whether

4s. per 1000 is an exorbitant price to charge for 18-candle gas. The examples of Manchester and Walsall are nothing to the purpose unless we are told the amount of debt on the several undertakings. At Manchester we know it to be small; at Macclesfield we believe it to be large, and this necessarily adds to the price of gas in the latter town. The agitation appears to have been got up as an electioneering dodge, previous to the municipal elections on the 1st, and will probably die out as soon as these are over. With all our belief in Corporation jobbery, we have absolutely no belief in disinterested patriotism, and supposing jobbery to exist in Macclesfield, the present outcry may be fairly set down to the rats outside the meal-tub. Mr. Flintoff received, it seems, permission to visit the works of the Corporation, but, perhaps feeling more at home on a platform than in gas-works, he declined to avail himself of the permission. Dr. Angus Smith, of Manchester, has been recently appointed gas examiner by the Corporation, so the consumers will now have satisfactory assurance of the quality of the gas supplied.

The downward tendency in the price of coal may now be said to be very pronounced, and we hope shortly to be able to recommence the publication of our price current. In Scotland, considerable reductions have already been made, and in house coals generally some fall has been experienced. In the price of iron an enormous decrease of price has recently taken place, and the trade seems to be returning to a normal state. The "coal ring" may, perhaps, be satisfied with the immense gains they have lately acquired, and be content now to allow trade to assume a natural course.

The Metropolitan Board of Works appear to be in some trouble about their gas-testing, now that the referees have ceased to supply chemicals for the purpose of testing for impurities. There is not, however, the smallest need for it. If an excess of ammonia should be reported (which is extremely unlikely, except from an accidental cause, since the gas companies find it so profitable to take all out), the matter would, in case of appeal, be decided by an independent examination of the liquid reserved for a week, for the purpose of confirming or otherwise the examiner's report. The same with sulphur. No technical point could arise as to the preparation of the chemicals, respecting which the Act gives no directions.

The Dublin Corporation have resolved on the purchase of the gas-works supplying the city. The company are about to apply to Parliament—reasonably enough, seeing the provisions imposed on them by their last Act—to raise the maximum price, and the application is to be met by the Corporation with a Bill to effect a compulsory purchase, or to establish competing works. This continual harassing of the company is disgraceful to the Corporation. It is only a year and a half since an expensive contest between the Corporation and the company took place, and now another is to be forced upon them. The gas consumers of Dublin, however, must pay for it all in the long run, and they will probably find themselves not so well off under the Corporation as they have been under the company. A competing scheme is not likely to receive the sanction of any committee of either House of Parliament; and, if the undertaking be purchased, it must be on such terms as may, in the uncertain future of gas affairs, cause the Corporation to regret that they meddled with the business. No warning, we believe, would affect the resolve of the Corporation, but we may quote a sentence from the *Hampshire Advertiser*, which, speaking of Ryde a day or two ago, said: "The example of this town in endeavouring to buy "the gas-works, seeing the misery it has entailed, should act "as a warning to other towns in the empire." But the result in Dublin may be worse than in Ryde, seeing that there will be parliamentary expenses, and probably arbitration costs, as well as the purchase-money, to pay.

Rumours of other amalgamations among the metropolitan gas companies have lately been current, but we mention them only to contradict them. It was said that the Imperial, Independent, Commercial, and Ratcliff Companies were discussing the terms on which they could unite. The combination looks highly improbable. The foundation for the report, probably, was some informal discussions between the London, Imperial, and Independent Companies, which, however, have ended, leaving the companies apart for the present.

A few more advances in price have been announced since our last, but we shall probably hear of no more until after Christmas. At Dalkeith the price has been raised to 5s. 6d.; at Godalming 8d. has been added; at Painswick, 1s. 6d.; at Stroud, 1s. 2d.; and at Southampton the charge for public lamps has been raised from £3 15s. to £4 5s. The price has also been raised at Crieff from 7s. 1d. to 7s. 6d., and at Kilbarchan from 5s. 5d. to 6s. 8d.

Old friends with new faces are continually turning up, the last being an invention, of which more may possibly be heard, for the production of a new patent gas. As described, it consists in generating gas in ordinary retorts much in the usual way, and then passing the gas through a series of pipes, or small auxiliary retorts, filled with porous substances, which in an incandescent state either absorb or convert into permanent gases almost all the impurities in the original gas, leaving it in a condition fit for use. After the collapse of recent schemes, this looks a promising invention for exploitation by a limited liability company, and may strike those who never heard of Mr. Basford as something perfectly novel. Considering all things in connexion with this invention, we should not be at all surprised to hear of a new patent gas company, or possibly the existing Patent Gas Company might like to secure so valuable a property as this patent.

We give this week a short obituary notice of the late Mr. T. G. Barlow, for which we are indebted to the joint assistance of several of his oldest friends. We may add that the proprietorship of this JOURNAL falls, by the will, to his widow, for whose benefit it will be carried on. With respect to its literary and scientific management, it will be a satisfaction to the subscribers to know that the kindest offers of assistance have been received from many friends of great eminence in the gas world, and that every effort will be made to maintain for the publication the high character it has so long borne. Those of our subscribers who are supplied with the JOURNAL direct from the publishing office will receive with this number a Portrait of the late Mr. T. G. Barlow. Those who obtain their copies from booksellers and news agents will receive the portrait with the number for the 19th inst.

Miscellaneous News.

METROPOLITAN BOARD OF WORKS.

At the Weekly Meeting of the Board, on Friday, Oct. 25—Colonel HOGG, M.P., in the chair,

Mr. NEWTON brought up a report from the Works and General Purposes Committee, which contained the following recommendations:—"That the terms of the London and Chartered Gas Companies for lighting, cleaning, and extinguishing the lamps on the river wall of the Victoria Embankment—viz., 15s. per annum—be agreed to; but that the painting and repair of the lamps be undertaken by the board; that, in consideration of the additional duties devolving upon Mr. Keates by the alteration made by the Board of Trade in the constitution and duties of the gas referees, he be allowed an annual sum of £60 towards the cost of an assistant; that Mr. T. Wills, the gas examiner appointed by the board to test the gas supplied by the Imperial Gas Company at Chelsea, be transferred to the testing-place in Arundel Street, Haymarket, there to test the gas supplied by The Gaslight and Coke Company, all the terms and conditions of his original appointment remaining the same." In moving the adoption of the report, Mr. Newton said that in reference to the first recommendation he had since been informed that 15s. a lamp was too high, and that portion of the report had better be referred back to the committee. Upon the second paragraph he remarked that hitherto, in carrying on gas-testing in the metropolis, the necessary chemicals had been supplied by the gas referees, but as they had announced their intention to discontinue the supply of chemicals in future, it was proposed by the committee that Mr. Keates should provide the same, which would necessitate extra assistance being accorded to him for that purpose, at an annual cost, as stated in the report, of £60 per annum.

Mr. E. DRESSER ROGERS opposed the adoption of the recommendation, and expressed regret that he was not present at the meeting of the committee when it was arrived at. In opposing the clause, he was not actuated by any desire to place an impediment in the way of Mr. Keates's conducting the examination of the gas of the metropolis; but he thought that the question required further consideration by the committee and the solicitor of the board before they adopted the report, or came to any decision upon the matter in question. It would be necessary to take into consideration the present method of testing gas in the metropolis. Under the present system of the Board of Trade and the orders issued from that department, the gas referees refused to furnish chemicals any longer. Upon reading the Act of Parliament, he feared that, should any necessity arise for the technical proving of the examiner's reports, it would become a question as to whether the preparation of the chemicals would not be a vital point. For the reasons which he had stated, and the further consideration of the circumstances in connexion therewith, he moved, as an amendment, that this paragraph of the report be referred back to the committee.

Mr. FURNISS fully endorsed the remarks which had been made by Mr. Dresser Rogers, and seconded the amendment.

Mr. NEWTON, in reply to a member of the board, said that under the recommendation of the committee, if adopted, Mr. Keates would supply his own chemicals, and the £60 per annum included the extra cost which would be incurred under the new *régime* introduced by the Board of Trade.

Mr. RUNTZ said the referees, under the order recently issued by the Board of Trade, refused to furnish chemicals any longer, and therefore their duties practically ceased, although they still continued to receive large salaries. The matter would be met by the chief gas examiner, Dr. Letheby, completing his new experiment. At the same time he thought sufficient weight attended Mr. Rogers's observations to justify referring the matter back to the committee.

The clause was referred back accordingly.

Dr. VOELCKER'S ANALYSIS OF WATER FROM THE WEALDEN CLAY OF SUSSEX.—A correspondent of the *Brighton Guardian* writes: "Under the impression that some of your numerous readers may like to have an idea of the chemical character of water drawn from a well sunk in the wealden clay of Sussex, I forward you, as under, Dr. Voelcker's analysis of a gallon of water drawn from a well sunk in such clay on Colvell's Farm, Barcombe:—

Oxidizable organic matter	0·51
Oxides of iron and alumina	0·55
Sulphate of lime (gypsum)	30·26
,, of magnesia (Epsom salts)	20·01
,, of soda (Glauber salts)	135·68
Chloride of sodium (common salt)	53·24
Soluble silica	0·30
Other carbonates	28·90
Total solid matter of such gallon of water, dried at 150 degrees	269·45 grains.

It is satisfactory to know, however unpleasant to the taste such water may be, in Dr. Voelcker's opinion it contains nothing injurious to the system either of man or animals. In his letter to me he further states that in some districts such water would be held in high medical repute."

SINGAPORE GAS COMPANY, LIMITED.

The Half-Yearly Ordinary General Meeting of this Company was held at the London Tavern, on Tuesday, Oct. 22.—H. P. Stephenson, Esq., in the chair.

The notice convening the meeting having been read by the Secretary (Mr. R. King), the following reports and statements of account were presented:—

The directors have the satisfaction of reporting continued progress in the lighting of Singapore, for particulars of which they refer to the report annexed, from their engineer and manager, Mr. E. J. Wells, dated Aug. 31, 1872.

The balance-sheet to June 30, 1872, and appended to this report, shows the financial position of the company. The directors have written off for depreciation of works and plant, and off the expenses of first establishment, as per balance-sheet, at the rate of 1 per cent. per annum. The profit for the half year, after writing off these sums, amounts to £1805 6s. 7d., which, together with £19 5s. 2d. the unappropriated profit of the preceding half year, makes the available balance £1824 11s. 9d. Out of this sum the directors recommend the declaration of a dividend at the rate of 7½ per cent. per annum, less income-tax on the amounts paid up on the preference and original capital; the balance of £14 16s. 4d. to be carried forward to the profit of the suceeding half year.

The dividend to be payable on the 31st of October next.

The report of Mr. Wells, the engineer and manager, was as follows:—

Gentlemen,—I herewith forward to you all the balance-sheets, statements of accounts, &c., showing the working for the half year ending the 30th of June.

You will perceive that the increase in the gas-rental at first sight shows only 142·89 dols.; the reason is, that during the half year the Chinese have not been allowed to hold their Wyangs, and upon these receipts there has been a diminution of 394·62 dols.; on reference to the accounts you will find that the increase on the legitimate gas-rental has been 537·51 dols. over the previous half year, which I think is satisfactory.

Upon the receipts for products, &c., and also on the general disbursements, there is nothing particular which calls for any remarks, as all these are fully detailed in the profit and loss account, so that it is not necessary for me to take up your time with details.

In reference to my last report on the coal question, I there stated that two ships had been taken up to load in Australia. The one taken up in Batavia, soon after leaving that port for Australia became a total wreck; the other one, instead of arriving at the end of March, did not reach here until the 16th of May, making a passage of 83 days from Australia. This placed us in difficulties for coke-making coals, and in consequence we had to purchase coals of an inferior quality here to supply this want.

Up to the present date we have not been able to procure any further supplies of coal from Australia; the continued high rates for freight ruling for China ports has prevented our agents from obtaining another ship, although 26s. per ton has been offered By last mail I sent you the extracts of letters from Australia, and also the price current, which will show you the state of the coal market. We are again running very short of coke-making coals, and are using Labuan, with only sufficient Australian to make coke for the furnaces. I am still in hopes to hear next mail that a ship is on the way from Australia, and as soon as freights are at reasonable rates, we purpose laying in a heavier stock of coals, orders have been in Sydney, and also in Newcastle, for upwards of twelve months for this purpose.

In the report of the annual meeting, held on the 30th of April, I noted that a question was asked, "whether we should again suffer from high tides." I would state that with the surplus clay from the new gasholder-tank, an embankment has been thrown up on the river side of the works, which will prevent the works from again been flooded with the high tides.

Carbonizing.—The three benches of retorts are still in work satisfactorily, the other two benches have been thoroughly repaired, and are ready for work at any time.

Extensions of Mains.—Nothing has been added to the capital account for extension of mains during the half year.

The New Gasholder is satisfactorily completed and ready for work; the difficulty is in obtaining water to fill the tank. I have laid drains from nearly all parts of the yard to the pond, and barely obtain enough to supply the works, the season has been very dry; but as it is just upon the change of monsoon, we may expect soon some heavy rains. There is at present 6 feet of water in the tank of the new gasholder.

Fitting Department.—During the half year the fitters have all been fully employed, resulting in a steady increase in houses lighted. We have now several large Chinese houses with the pipes fixed ready for the fittings when they are completed. The Chinese now have the pipes fixed when the building is in progress, so that gas becomes a permanency with them.

For the past fortnight all fittings in houses have had to be stopped where possible, as we have been so busy with the illuminations for the Chinese festival of "Sambayang Unto;" it closes on the 2nd of September. There have been 13 nights when illumination devices have been fixed.

Lighting Department.—The statements show that during the half year 39 new houses have been lighted up, making 487 lights and 5 boiling stoves additional.

The *Engineer's Report* for the half year will furnish all the details in this department. The loss by leakage, &c., has been more than the preceding half year. This has arisen from some of the original services having become defective; they have been renewed where necessary, and I am in hopes to show a decrease at the close of the present half year.

Collection of Rental, &c., during the half year has been satisfactory, as out of the amount shown as due for the half year, say, 30,105·35 dols., 29,642·95 dols. has been collected and paid to bank.

The arrears are slightly below the previous returns. Exchange has also been favourable, only showing a loss of 35·17 dols. on the 15,368·50 dols. remitted.

In the *Purifying Department* all is working satisfactorily; the general apparatus is in an efficient condition both for produce and supply. All the buildings, works, and plant, are in good repair.

In conclusion, I trust that all the accounts, as forwarded, will be found correct, and the general working for the half year will be satisfactory to the directors.

Balance-Sheet, June 30, 1872.

Dr.				*Cr.*		
To Capital—				By Cash at bankers	£602 7 8	
£5 paid on 2000 preference shares	£10,000 0 0			Ditto in hands of secretary	4 7 2	
£5 ,, 7829 ordinary ditto	39,145 0 0			Bills receivable	3,350 0 0	
£2 ,, 25 ,, ,,	50 0 0					£3,956 14 10
£1 ,, 470 ,, ,,	470 0 0			Office furniture		174 14 6
		£49,665 0 0		Cost of works and plant, as per last statement	32,533 2 9	
10,324 shares.				Add extensions during half year	499 18 4	
					33,033 1 1	
Debenture bonds		8,370 0 0		Depreciation at the rate of 1 per cent. per annum	156 10 0	
Sundry creditors		865 9 8				32,876 11 1
Insurance reserve-fund		25 17 3		Purchase of land		1,116 2 8
Profit and loss		1,824 11 9		Retort account		318 5 1
				Meter renewal account		211 1 5
				Stock on hand		6,989 9 4
				Amounts charged to capital for travelling expenses, rent, preliminary expenses, and interest on capital during construction	10,840 5 11	
				Less amount previously written off	283 13 3	
					10,556 12 8	
				Less amount written off during this half year, at the rate of 1 per cent. per annum	54 0 0	
						10,502 12 8
				Gas, meter-rental, fittings, and sundries under collection to June 1	1,449 18 11	
				Gas, meter-rental, &c., for the month of June, and gas for public lamps for the half year	2,141 10 11	
						3,591 9 10
				Sundry debtors		307 10 0
				Travelling expenses, suspense account, and sundries		204 7 3
		£60,750 18 8				£60,750 18 8

Profit and Loss Account, from January 1 to June 30, 1872.

Dr.		*Cr.*	
To Coal carbonized	£1,747 1 8	By Balance at profit and loss, Dec. 31, 1871	£1,689 18 1
Lime and oxide	13 5 0	Less amount declared as dividend, after deducting income-tax from ordinary and preference dividends	1,670 12 11
Trade and general charges	255 18 3		£19 5 2
Rent, rates, and taxes	141 10 2	Gas and meter rent	4,912 5 11
Directors and auditors	205 5 0	Products, profit on fittings, and sundries	856 18 8
Salaries and collector's commission	544 18 2		
Wages	370 11 3		
Interest on loans and debentures	288 1 0		
Loss on exchange	7 18 3		
Bad debts and allowances	46 9 3		
Retort account	50 0 0		
Meter renewal account	32 10 0		
Depreciation on works and plant, and expenses of first establishment, written off	210 10 0		
Travelling expenses	40 0 0		
Office furniture, written off	5 0 0		
Law expenses	5 0 0		
Balance—profit for appropriation	1,824 11 9		
	£5,788 9 9		£5,788 9 9

The Chairman moved—"That the report, with the balance-sheet attached thereto, be received, adopted, and entered on the minutes." In doing so, he said the report which Mr. Wells sends us informs us very fully as to the state of the company's affairs, and if you will examine the accounts now laid before you, it will be seen that we are in a very prosperous condition. The only thing that calls for remark is, that while the cost of coal remains about the same, the gas-rental has only increased £43 over that of the previous half year. Mr. Wells accounts for this by the fact that the Chinese have not been allowed to hold their theatres. From this he estimates that there has been a diminution in the receipts of about 200 dollars. Notwithstanding this diminution, however, it is satisfactory to observe that there is an actual, though but a small increase in the gas-rental. We have, during the half year, been in considerable difficulty respecting our coal supply. We have not been able to secure a supply of Australian coal, and during one month we were dependent very largely upon the use of steam coal—a coal which gives very little gas—and upon Labuan coal, which gives no coke. Since then we have had a shipload of gas coal arrive at Singapore, but still our chief supply is from Labuan, and this has a serious effect upon our products. As regards the item in the accounts, "Products, profits on fittings, &c., £856 18s. 8d.," I may remark that in the balance-sheet at the end of 1871 the amount stood at £1044 8s. 2d., so that there is a falling off in this item of £187 9s. 6d. This is accounted for by a difference of £80 in the returns for coke, arising from the cause to which I have just referred, and also by the fact that, though there has been a slight increase of £26 for sale of tar, there is a falling off of nearly £80 on fittings account, the "sundries" remaining about the same. The only other point which at all calls for any remark by me is the fact that, though our new tank and gasholder are complete, we have not been able to put them to work for the want of water to fill the tank, so that the outlay to which we have been put in the construction of this addition to our plant is as yet yielding us no interest. If we had this new gasholder in use, we should be able to give a better supply of gas, though I believe our present supply is very good; at all events, we should be able to send out more gas, and somewhat economize our working. Mr. Wells is looking up at the clouds and expecting showers, but so far as our latest intelligence goes he had not been blessed with a downfall of ruin. With these observations I move the adoption of the report.

Mr. Le Feuvre seconded the motion, which was carried unanimously.

The Chairman moved—"That a dividend be declared on the ordinary and preference shares at the rate of 7½ per cent. per annum, less income-tax, on the amount paid up on such shares from the respective days of payment to June 30, 1872, such dividends to be payable on Oct. 31."

Mr. Nicholls seconded the motion, which was carried *nem. con.*

The Chairman moved—"That the best thanks of the shareholders be presented to Mr. Wells, the company's engineer and manager, for the zeal and energy displayed by him in the conduct of the business of the company."

Mr. Collard seconded the motion, which was at once agreed to.

On the motion of Mr. Williams, a vote of thanks was given to the directors and to the local committee at Singapore for their services.

The Chairman appropriately acknowledged the vote.

Mr. Foreman moved a vote of thanks to Mr. R. King, the secretary.

Mr. Rice seconded the motion.

The Chairman, in submitting the same to the meeting, said: No one knows better than I do the manner in which the duties of Mr. King's office are carried on. I can only say that I am sure the business of the company would not progress in the way it does, and that you would not have all the information respecting it in the fair and lucid mode in which it is submitted, were it not for the attention and energy which Mr. King devotes to your service.

The motion was cordially adopted.

The Secretary briefly responded, and the proceedings terminated.

CEARA GAS COMPANY, LIMITED.

The Annual Meeting of this Company was held at the Office, Coleman Street, London, on Wednesday, Oct. 30—A. Angus Croll, Esq., in the chair.

The Secretary (Mr. T. Guyatt) read the notice convening the meeting, and the following report and accounts were presented:—

The directors herewith present the accounts duly audited for the year ending the 30th of June last.

After paying the interim dividend in May, the balance available is £2022 6s. 6d., from which the directors propose to pay a dividend of 5 per cent. for the half year ending the 30th of June, making, with that paid in May, 9 per cent. for the year, and to carry the balance of £522 6s. 6d. to next account.

Although the profits, as shown by the accounts, would enable the directors to make up the dividend to 10 per cent. for the whole year, they yet consider it advisable, having regard to the present position of the coal market, to carry over a larger balance than usual.

The directors who retire at this meeting are Lord Alfred S. Churchill and A. A. Croll, Esq., who, being eligible, offer themselves for re-election.

Mr. Arthur J. King, the auditor, also retires, and, being eligible, offers himself for re-election.

Balance-Sheet, June 30, 1872.

Dr.				*Cr.*		
To Capital paid up, viz.:—				By Investment—		
3000 shares, of £10 each		£30,000	0 0	Per balance-sheet to June 30, 1871	£27,462 17 3	
Debentures issued		4,400	0 0	Additional during the twelve months ending June 30, 1872	874 16 4	
Dividends unpaid		109	4 0			£28,337 13 7
Amounts due by the company		1,104	14 2	Stock of materials, gas-fittings, coals, and meters at Ceará		3,217 5 1
Revenue account—				Amounts due to the company for public and private lighting, gas-fittings, and products		2,323 10 3
Balance of account, June 30, 1871 £1,385 4 7				Sundry balances		393 19 3
Net profits for the twelve months ending June 30, 1872 3,120 4 8				Office furniture in London and at Ceará		192 7 0
	£4,505 9 3			Cash—		
Less dividends declared—				At London bankers	230 9 0	
On October 20, 1871, at 4½ per cent. for the half year 1,307 2 9				J. Anderson, at Ceará	624 16 2	
On May 5, 1872, at 4 per cent. for the half year 1,176 0 0				Singlehurst and Co., ditto	1,531 6 6	
	2,483 2 9					2,386 11 8
		2,022	6 6	Bills receivable—		
				In London	500 0 0	
		£37,636	4 8	At Ceará	284 17 4	
						784 17 4
						£37,637 4 1

Revenue Account, for the Twelve Months ending June 30, 1872.

Dr.		*Cr.*	
To Coals carbonized	£1,726 11 5	By Gas supplied to public lights	£5,074 16 4
Manufactory	551 10 11	Private consumers	2,710 15 2
Repairs and maintenance of public lamps	436 9 8	Residual products	195 12 6
Maintenance	346 9 10	Profit on gas-fittings	435 19 7
Salaries	768 5 0	Interest	57 5 0
Rent and taxes	185 0 0		
Commission	36 11 9		
Directors fees	400 0 0		
Auditors ditto	10 10 0		
Bad debts and allowances	158 10 3		
Charges, office expenses, and sundries	223 19 4		
Interest on debentures	261 17 2		
Income-tax (London)	96 16 11		
Ditto (Ceará)	146 16 6		
Loss on exchange	4 15 4		
	£5,354 4 1		
Net profit for the year ending June 30, 1872	3,120 4 8		
	£8,474 8 9		£8,474 8 9

The Chairman moved the adoption of the report, and congratulated the shareholders on the satisfactory position of the company's affairs. Notwithstanding the difficulties which all gas companies had had to encounter during the past year, this company were enabled to pay a dividend of 9 per cent., and to carry over a balance of profit amounting to £522 6s. 6d.; whereas in the previous year they could only pay a dividend of 8 per cent., and carry forward a balance of but a few pounds. This proved that they were proceeding in a satisfactory manner. There was but little to remark upon on this occasion. Of course, the cost of coal was a serious matter for all companies, but so far as this company were concerned, it had not much increased in the last twelve months. The current year, however, would show a difference in this respect. About one-third of the coal required for this year would cost the company about 10s. per ton additional, but he hoped the improved rental would make up for this increased cost, and he did not believe the price of coal was at all likely to remain at the present high rate, or would have to be purchased at a cost which would at all interfere with the profitable working of the concern.

Lord Alfred S. Churchill seconded the motion.

Mr. Ede asked whether the capital of the company might be considered as fixed at £30,000. He saw that there had been an addition of some few new shares during the last six months, and he wished to know how that arose.

The Chairman said the share capital of the company was now £30,000. Last year it was £29,400. The additional £600 consisted of shares not then issued, and was required to pay for the expenditure of £800 in the construction of coal stores and extension of mains. The Government, according to the terms of their contract, called upon the company to lay down certain mains, and the directors were very pleased to do so, as, in addition to an increase in public lamps, the mains were laid in a district containing a considerable number of private houses which were now supplied with gas. In fact, the quantity of gas-fitting during the last year had been so extensive that the company derived a profit of over £400 from this source alone. The whole benefit of the additional outlay did not appear in the present accounts; next year would show it.

The motion was carried unanimously.

On the motion of Dr. Fraser, the re-election of Mr. Croll and Lord Alfred Churchill was agreed to. Mr. A. J. King was also re-elected auditor of the company.

The Chairman and Lord A. Churchill returned thanks.

Mr. R. King proposed a vote of thanks to the chairman and directors, which was seconded by Mr. Ede, and carried unanimously.

The Chairman, in acknowledging the vote, took occasion to refer to the services rendered to the company by Mr. Anderson. He believed in that gentleman they had one of the best managers it was possible to obtain or could desire. No man could feel more anxious for the interests of the company than he did, and no man was more capable of successfully carrying on their operations. It would, no doubt, be a satisfaction to Mr. Anderson, labouring at so great a distance from home and amongst strangers, to know that he possessed the confidence and approval of the shareholders; and, therefore, he hoped the meeting would pass a special vote of thanks to him for his services.

Dr. Fraser seconded the motion, which was cordially adopted.

A vote of thanks was also given to Mr. Guyatt, the secretary, which having been suitably acknowledged, the proceedings terminated.

Carburetted Hydrogen and the Oxyhydric Light.—The following report relates to a new mode of carburation which has been adopted to some extent in Buffalo, U.S., and with some apparent success:—"The carburetted hydrogen is made by procuring hydrogen on a large scale from water, and then combining it with the vapour of naphtha. I will give the process in detail. Water is composed of the two gases, hydrogen and oxygen, in chemical combination. In obtaining hydrogen the water used is first converted into steam, and then superheated. This produces no chemical change. The superheated steam is now passed through a furnace containing coke at a *high temperature*, and here a chemical change takes place, the result being a *mixture of hydrogen with carbonic oxide and carbonic acid gases*. To obtain the hydrogen pure the other gases must be separated, which is accomplished by passing the mixed gases over lime heated in iron retorts. The purified hydrogen goes from these retorts to a small reservoir, and from thence to the carburetter. This is an apparatus so arranged that the hydrogen is carried over the surface of naphtha at a temperature of 150°. The naphtha is vaporized, and we have a gas containing *hydrogen* and *naphtha* vapour. This mixture now goes through retorts heated to about 700°, which serves to *decompose* the naphtha vapour, and cause it to combine partially with the hydrogen, producing a fixed gas, perhaps as little liable to condensation as the carburetted hydrogen made from coal. It then has only to be cooled and stored in the reservoir for use. The materials used, according to their statement, are superheated steam, a small amount of coke, and 2½ gallons of naphtha for the 1000 feet of gas. The lime used for purifying the hydrogen is cleansed by passing superheated steam over it, and they claim to be able to use it repeatedly. They manufacture by this process a kind of carburetted hydrogen, which will answer all the purposes of illuminating gas, which gives a good light, and which, in my opinion, will not condense in the pipes in cold weather to a greater degree than gas produced from coal. The question of its introduction is, then, only one of comparative cost. They claim to be able to make it very cheap, and the materials will certainly not cost much at present prices. But it is an undoubted fact that the supply of naphtha, or of any other material that would serve to carburet the gas, is comparatively limited, and the cost of such substances would probably advance greatly with an increased demand. I have always felt that this would be an objection to any process for the manufacture of illuminating gas, that depends on the products of petroleum. I am unable to make any comparison as to the amount of labour required, or of cost of apparatus and repairs. In connexion with this carburetted hydrogen they propose to use another gas (oxygen) obtained from air, of which it constitutes more than one-fifth of the bulk, by a new and cheap process. When manganate of soda is heated in the air, it takes up some oxygen, and if then it is heated in connexion with vapour of water, it gives this oxygen out again. The manganate of soda is manufactured by heating together bi-oxide of manganese, and caustic soda—both substances easily obtained. The material so formed is placed in cast-iron retorts and heated. When at a red heat, air is blown through the retorts, and oxygen is taken up. When the largest possible amount of this gas has been absorbed, in perhaps 10 to 15 minutes, the blast of air is stopped, and steam substituted. The oxygen before taken up is now given off in almost a pure state, and has only to be passed into the reservoir for use. This process can be repeated *ad infinitum*, a quantity of oxygen gas being produced each time. Oxygen is a fixed gas, and can be readily stored and handled without danger. When used in connexion with the other gas, it increases the intensity of the light at least three or four fold, and if it could be safely mixed with the carburetted hydrogen in the reservoir, and distributed through a single pipe, would leave nothing to be desired. But this is impossible on account of the great danger of explosion. If the two gases are used together, it is necessary to have them distributed in separate pipes, and to allow them to come together only at the burner. You can judge better than I how much it would add to the cost of the gas to have the two sets of pipes to lay down and keep in repair. If the gases should leak into a room or cellar and an explosion occur, it would be likely to be much more dangerous than if it was simply coal gas. The chance of such a catastrophe is perhaps worthy of consideration. Oxygen has no odour, and so the usual means of detecting a leak in the gas-pipe could not be applied. They say that it is so cheap that they do not care how much they lose by leakage; but there must be a limit to that. The increased pressure that they must use to distribute so heavy a gas would increase the danger of leakage, I should say."—[Further details ought to be supplied as to the composition of the gas which results from passing naphtha vapours and hydrogen through retorts heated to 700°. It may be that a small portion of the naphtha is decomposed, but we believe the amount would be found to be very small, and we cannot agree with the opinion of the writer that the gas would not condense in the pipes more than ordinary coal gas.—Ed. J. G. L.]

Death of a Stoker at the Dewsbury and Batley Gas-Works.—Last Thursday morning a stoker named Lynch, in the employ of the Dewsbury and Batley Gas Company, was engaged in drawing the charges from some retorts in the retort-house, when he suddenly fell down and almost immediately expired. It is believed he was overcome by the fumes from the burning coke.

FOREIGN AND COLONIAL GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held at the London Tavern, on Wednesday, Oct. 30—W. H. Le Feuvre, Esq., in the chair.

The Secretary (Mr. Cole) read the notice convening the meeting, and the following report and statements of account were presented:—

Your directors have much pleasure in submitting the following report and balance-sheet for the half year ending the 30th of September last.

The works at Tunis are being rapidly proceeded with by Mr. Bower, the contractor, and will, it is expected, be ready to supply the city of Tunis with gas within the time stipulated in his contract—viz., by April next.

The trade of the Regency of Tunis is very flourishing, and has been much stimulated by the opening of the Tunis railways. The great encouragement given by the Government to all commercial undertakings in that country convinces your directors that a large income will be derived from the consumption of gas and the sale of coals and coke in the city and suburbs, which contain a population of about 150,000. Negotiations are nearly concluded for the purchase of several concessions and works in full operation. One of your directors, Mr. Colley, has gone to Tunis to report upon the progress of the works.

Your directors have not yet exercised the power given to them by the shareholders at the last general meeting, to issue the preference capital of the company, but they purpose doing so as soon as the negotiations for the purchase of the additional works and concessions are concluded.

In consequence of the pressure of other business, Mr. A. R. Jones, one of your directors, has retired, and Mr. Foster, late secretary to the Board of Trade Gas Referees, has been elected in his room. This election you are now asked to confirm.

Balance-Sheet, September 30, 1872.

Dr.			*Cr.*		
To Capital, viz.—			By Cash at bankers and in hand		£3,000 10 7
£10 0 0 paid on 4002 shares	£40,020 0 0		Expenditure to date on concession; cost of works and plant		42,556 17 0
5 0 0 „ 11 „	55 0 0		Engineering		300 0 0
2 10 0 „ 2 „	5 0 0		General charges, viz.—		
1 0 0 „ 39 „	39 0 0		Preliminary expenses	£780 5 0	
4054	40,119 0 0		Freight	9 13 1	
Debenture bonds, bearing interest at 6 per cent. per annum	3,500 0 0		Petty cash, &c.	5 8 4	
Sundry creditors—			Stationery and books	65 14 6	
On bills payable	£2,000 0 0		Debenture stamps	4 7 6	
On open account	1,103 16 0				865 8 5
	3,103 16 0				
	£46,722 16 0				£46,722 16 0

The Chairman, in moving the adoption of the report, said the state of the company was so clearly disclosed by that document that it would not be necessary for him to detain the meeting with many remarks upon it. He might, however, add that he had received a telegram from Tunis that morning which, as far as it was decipherable, confirmed everything stated in the report, Mr. Colley stating that the works were proceeding satisfactorily. With reference to the paragraph in which the directors announced that negotiations were nearly concluded for the purchase of several concessions and works in full operation, he might remark that those negotiations were still pending, and the directors had every hope that they would be carried out to a successful issue. Mr. Colley, after leaving Tunis, would proceed to visit one of the works proposed to be purchased, and make a full report upon it. It would then be a question whether the directors should purchase it or not at the price under which it had been offered to them. With reference to the question of the issue of preference capital, the directors had not as yet taken advantage of the authority given them for the purpose at the last general meeting. Probably they would do so shortly, but that would depend upon the question whether they purchased the works to which he had alluded, or required additional money for extensions at Tunis. He might add that he had every reason to believe the Foreign and Colonial Gas Company would be a very successful undertaking. It was established, as most present were aware, not simply for the carrying on of the works at Tunis, but generally for operating in gas-works abroad, whether in foreign countries or in the colonies. It might, perhaps, seem a bold expectation on his part, and yet he saw no reason why the shareholders might not hope for an equal amount of success to that achieved by the Continental Union Company or the Imperial Continental Association. With regard to the various so-called improvements in gas lighting, he remarked that this company would be prepared to adopt any invention which gave a fair promise of being successful. At the same time, speaking for himself, he was not sanguine respecting any of those recently placed before the public. As to the oxyhydric light, a year or two ago it was exhibited at the Crystal Palace, and seemed likely to be a success; but it had this disadvantage, that it involved the necessity of a large additional outlay for duplicating the distributory pipes. As to the patent gas scheme, notwithstanding the wonderful statements published in the papers, he rather inclined to agree in the views expressed thereon by Mr. Bower. However, its success remained to be proved, and meantime the fluctuations which had taken place in the company's shares was no criterion of the real value of the invention. With regard to "air gas," most gas engineers seemed to have little or no faith in it. In fact, it was an old idea revived. History, it was said, repeated itself, and the same might be said of inventions and patents for improvements in gas lighting. Looking at the list in the Journal of Gas Lighting, there appeared to be five or six new patents sought for every fortnight, and he had ascertained that about 5000 patents had been taken out for improvements in one or other branch of this department of industry. No doubt if "air gas" could be adopted it would create a revolution in the gas world, but there seemed to be great difficulties in the way, for all experience proved that such gas could not be made to travel far, that there would be constant condensation in the pipes, which consequently would soon be clogged up. Then there was the serious consideration of the storeage of so dangerous a spirit as was required in its production, which would involve at the outset the repeal of the Act under which the storeage of petroleum in the metropolis was regulated. As he before remarked, this company would be quite ready to adopt any invention which the test of experience proved to be practically beneficial, but they would not rush headlong into the adoption of any untried scheme, however promising it might appear.

Mr. Glaisher, F.R.S., in seconding the motion, said he could confirm every observation the chairman had made on the subject of new inventions. It was now 30 years since the late George Lowe and himself entered into the question of the employment of hydrocarbons, and at the Royal Observatory, at Greenwich, from that time to the present he had had an apparatus for the purpose in use. He required a more intense light than could be obtained from the gas supplied by the Phœnix Company, and had therefore resorted to this means for increasing its power. But it was attended with this inconvenience, that at any change of temperature, even in the time of summer, and at night, some of the pipes out of doors became blocked up by the cold throwing down the hydrocarbons. The consequence was that every week in winter, and every fortnight in summer, all the pipes about the Royal Observatory required to be washed out with in water to keep them at all clear. He did not, therefore, see that "air gas" was ever likely injuriously to affect gas companies in general. Like many others of the 5000 patents referred to by the chairman, he thought this invention would be shelved. As to patent gas, he knew something about it being connected with Barnet. Certainly, it did possess a high illuminating power, but up to the present time Dr. Eveleigh had not given him the opportunity of thoroughly investigating the matter. He believed it was only gas generated at a low temperature, and what he wanted to ascertain was the results as exhibited at the consumers meters, and not merely the results as shown by the station-meter at the works. He was told that from a ton of Silkstone coal 10,000 or 11,000 feet of gas could be obtained, but he did not know whether this was at the consumers meters or not. He for one was quite ready to adopt any improvement when it was shown to be so, both with regard to illuminating power and cost of production. Indeed, if stokers strikes were to become general throughout the country, it would be necessary to look about them and see what could be done to meet the difficulties they would involve. But while ready to recognize every real improvement, it behoved all persons connected with the management of gas-works not to be led away by any untried and self-asserted improvement.

The motion was put, and carried unanimously.

Mr. Bower moved, and Mr. Marshall seconded, the re-election of the auditor, Messrs. Harding, Whinney, and Co.; and on the motion of Mr. Jardine, seconded by Mr. Gielgud, a resolution confirming the election of Mr. Foster as a director was agreed to.

The Chairman said this was the whole of the business to be transacted. He hoped, at the expiration of six months, to be able to announce to the shareholders the satisfactory lighting of Tunis.

On the motion of Mr. Glaisher, seconded by Mr. Bower, a cordial vote of thanks was given to the chairman and directors.

The Chairman acknowledged the compliment, and the proceedings terminated.

SHEFFIELD UNITED GAS COMPANY.

The Half-Yearly Meeting of the Shareholders was held on Monday, Oct. 21—Mr. J. Hobson (in the absence of Mr. Lockwood) in the chair.

The following report of the directors was presented:—

Your directors have pleasure in laying before you the accounts for the half year ending the 30th of June last, which show that the profits will leave a surplus of £1045 3s. 7½d., after paying thereout the usual maximum dividend. The dividend will be as under:—

Dividend on £135,000 class A stock, after the rate of 10 per cent. per annum	£6,750 0 0
Dividend on £209,053 10s. class B stock, after the rate of 10 per cent. per annum	10,452 13 6
Dividend on 9970 new £10 shares (£4 per share paid up, but of which only £3 participates in the present dividend), at 7½ per cent. per annum, being after the rate of 2s. 3d. per share	1,121 12 6
Total	£18,324 6 0

The balance of £1045 3s. 7½d. remaining after payment of the above dividend will be added to the reserve-fund, which will then amount to £35,562 11s. 11½d. Your directors are happy to say that the company is, to a considerable extent, protected from the adverse consequences resulting from the very exceptional advances that have been made in the price of coal and cannel by contracts entered into in the earlier part of the year. Important alterations and modifications in the Municipal Corporations (Borough Funds) Bill, referred to in the last report, were made during its various stages through the two Houses of Parliament, and your board did not anticipate that, in the form in which it passed into an Act, it can be at all prejudical to the company. The hope expressed at the last meeting that the additional works at Neepsend would be available before the end of the present year will, your board have no reason to doubt, be realised. Your board have contracted for the erection of the new offices adjoining the approach from the Haymarket to the Midland Railway Station, and the works are in progress. The three elected directors, who now retire by rotation, are Messrs. William Lockwood, Charles Hoole, and Ebenezer Hall; each offers himself for re-election.

The Chairman, in moving the adoption of the report, said the past six months had been anxious times for those who had had the manufacture of gas in hand, but this company had been able to make favourable contracts for the supply of coal, and he might say (although he was only making the statement upon his own responsibility as an individual director) that this favourable state of things not only applied to the past half year, but that there was every prospect of its supply to the present half year; therefore any idea that there were grounds for a shareholder to feel uncomfortable was quite unfounded. He said this because he knew there had been a good deal of anxiety as far as shareholders were concerned, but he himself felt perfectly comfortable on the point.

Mr. Clark Branson seconded the resolution.

Mr. Sissons drew attention to the fact that recently a new kind of gas had been submitted to the public. In reply to the chairman, Mr. Sissons said he referred to what was known as "air gas."

The Chairman observed that this was one of three new kinds of gas brought before the public during the past few months. He did not think, however, that the latest kind suggested would prove successful, or be adopted. He might mention that not very long ago the shares in the company stood at 14s. premium, and they were now at 13s. 4d. discount. Further comment he thought hardly necessary on the subject.

Mr. H. Unwin, engineer to the company, replying to the point raised by Mr. Sissons, read a paragraph from the Journal of Gas Lighting, which emphatically condemned the principle of the manufacture of the new gas.

Mr. Eadon expressed an opinion that the new gas stood no chance of public approval or adoption.

The report was then put and carried.

A resolution was next submitted declaring a dividend at the rate of 10 per cent. on class A and B stock, and 7½ per cent. on the ordinary £10 shares.

This proposal also was carried unanimously.

Messrs. William Lockwood, Charles Hoole, and Ebenezer Hawke were re-elected directors of the company, and a vote of thanks was given to the directors for their services.

Mr. Eadon, in seconding the motion, remarked that while most other companies had had to raise the price of gas, in consequence of the difficulties which had attended the manufacture of it, this company had prepared for the emergency with the most commendable foresight. He thought the town at large, as well as the shareholders, ought to feel deeply indebted to the directors for their valuable services in this respect.

The Chairman, in acknowledging the vote, said the gratifying results which had been so kindly alluded to were owing in no small degree to the fact that the directors had been ably seconded by the officers of the company.

A vote of thanks having been given to the chairman for presiding, and it having been resolved to transmit a resolution of condolence to Mr. Lockwood, the meeting terminated.

Explosion of Gas at a Baptist Chapel.—On Monday, Oct. 28, an explosion of gas took place at the Baptist Chapel, Highbury Hill. It appeared that the man had turned on the gas and lit it, when by some means the plug of the service-pipe came out, and the gas rushed out under the staircase of the tower of the chapel and the explosion took place, blowing the windows and doors nearly to pieces. The firemen, who promptly attended, were unable to cut the communication from the pipe, and the gasmen had to be sent for to dig up the road and get at the main. Very considerable damage was done. The loss will fall on the Sun, Hand-in-Hand, and other fire offices.

BAHIA GAS COMPANY, LIMITED.

The Ordinary Half-Yearly Meeting of this Company was held at the Offices, 10, Coleman Street, London, on Tuesday, Oct. 22—H. P. STEPHENSON, Esq., in the chair.

The SECRETARY (Mr. A. J. Head) read the notice convening the meeting, and the following report and statements of account were presented:—

The directors herewith present the accounts for the half year ending June 30, 1872. It will be seen that the gas-rental and the receipts from products have increased; the cost of coal is slightly higher, and the total general disbursements are somewhat more.

Owing to the high price of iron, the directors have deferred for the present the construction of the coal jetty.

The directors recommend the usual dividend at the rate of 10 per cent. per annum on the preference shares, and 3 per cent. per annum on the ordinary shares; after which a balance of £504 5s. 11d. will remain to the credit of the profit and loss account, which is an increase, over the previous remaining balance, of £378 10s. 4d.

The directors retiring by rotation are Mr. Arthur Clarke and Mr. Erasmus Wilson, who are eligible, and offer themselves for re-election.

The auditor retiring by rotation is Mr. Magnus Ohren, who is also eligible, and offers himself for re-election.

Balance-Sheet, June 30, 1872.

Dr.			*Cr.*		
To Capital—			By Concession		£7,000 0 0
5000 ordinary shares	£100,000 0 0		Investment	£89,259 10 3	
1000 10 per cent. preference ditto	20,000 0 0		Additional during half year	473 16 10	
730 ditto redeemable ditto	15,000 0 0			£89,733 7 1	
250 ditto ditto, issue of Dec. 31, 1870	5,000 0 0		Freehold land	4,534 16 1	
	£140,000 0 0		Additional during half year	170 6 6	
Loan account	2,000 0 0			4,705 2 7	
Creditors—					94,438 9 8
On open accounts	1,098 0 10		Meters fixed		1,979 8 3
On acceptances	2,755 13 3		Office furniture		236 6 2
	3,853 14 1		Preliminary expenses		16,914 17 3
Dividends unpaid	87 2 0		Amounts due for gas, fittings, &c.—		
Profit and loss	4,004 5 11		Public lamps	1,315 13 3	
Reserve-fund	24 18 6		Ditto suspense account	3,053 5 1	
				4,368 18 4	
			Ditto establishments	4,068 16 8	
			Exchange, Brazilian Government	502 15 11	
				4,571 12 7	
					8,940 10 11
			Private rental and fittings	3,437 8 6	
			Sundry accounts	95 17 11	
			Stock—		3,533 6 1
			Coals	6,682 13 5	
			Coke	460 13 9	
			Cotton seed pitch	83 11 4	
			Fittings	2,659 2 5	
			Meters	896 15 0	
			Main and service pipes, lamp-columns, and other materials	2,759 19 0	
					13,542 14 11
			Goods in transit		341 0 11
			Bills receivable		2,503 7 4
			Cash at bank—		
			General account	359 7 4	
			Dividend ditto	87 2 0	
			Bahia	84 16 2	
			London office	8 13 0	
					539 18 6
	£149,970 0 6				£149,970 0 6

Revenue Account, for the Six Months ending June 30, 1872.

Dr.			*Cr.*		
DISBURSEMENTS.			RECEIPTS.		
To Coals carbonized (2485 tons 12 cwt.)	£4,891 0 6		By Gas supplied to public lamps	£3,762 11 5	
Purifying materials	203 0 7		Less fines	266 2 0	
Carbonizing wages	1,021 19 5			3,496 9 5	
Lamplighters wages	785 9 7		Private consumers	3,702 4 5	
Yardsmen, labourers, &c. (including the barra)	267 17 7		Public establishments	982 3 10	
Salaries (including collector's commission)	1,258 0 8				£13,180 17 1
Directors fees	400 0 0		Meter-rental		305 7 10
Auditors ditto	21 0 0		Products		1,812 11 6
Rent and taxes	65 3 9		Transfer fees		1 7 6
Interest	86 19 4		Profit on fittings		150 0 0
Stationery	60 13 10				
Office expenses	39 15 1				
Keep of horses	71 11 10				
Trade charges	206 19 2				
Wear and tear	716 12 4				
Repairs of public lamps	393 12 9				
Ditto of mains and services	78 2 10				
Travelling expenses	31 9 2				
Medical attendance	1 16 0				
Law charges	35 5 7				
	10,636 10 0				
EXTRA DISBURSEMENTS.					
Bad and doubtful debts	933 9 0				
Allowances	61 14 8				
	995 3 8				
Profit	3,878 10 4				
	£15,510 4 0				£15,510 4 0

Profit and Loss Account, June 30, 1872.

Dr.		*Cr.*		
To Dividend declared, April 30, 1872	£3,500 0 0	By Balance of account to Dec. 31, 1871		£3,625 15 7
Balance	4,004 5 11	Revenue account—net profit this half year		3,878 10 4
	£7,504 5 11			£7,504 5 11
		Balance		£4,004 5 11

The CHAIRMAN: Gentlemen, before I proceed to offer a few observations upon the report, I may mention that since that document was in print we have received an announcement that our offices at Bahia have been destroyed by fire. It will be satisfactory to you to know that we have obtained a settlement with the insurance company for the full amount at which the premises were insured. It will also be satisfactory to you to receive the information that, in accordance with the statement of our intention on a previous occasion, we have insured our works, fittings, and stock of coals on the works, to the extent of £17,000. Turning to the report, the first matter which calls for attention is the fact we communicate to you, that for the present we have deferred the erection of that, to us, very important work, the coal jetty. We have done so on account of the very high price of iron, and also on account of the great difficulty of getting any building operation undertaken, and the fancy prices asked for any work which may be submitted to contract. Since our report was in print, prices are, probably, a little more easy in the iron market, and we are in hope that, instead of having a jetty 20 feet above the road, we may be able to obtain the sanction of the authorities to construct it at the height of the quay wall, which would, of course, diminish the cost very much, and save us the expense of having to raise all our coal. The other point I think it right to mention is the dispute with the Government. Our manager, Mr. Kilkeary, who, I am happy to say, is present on this occasion, has, in conference with the directors, urged the desirableness of having this long-standing dispute with the authorities disposed of, and we contemplate taking steps which we hope will result in the accomplishment of that object. We are very confident in the position we have taken, and in the justice of our claim, and we hope we shall be able to show the Government that our view of the affair is the correct view. Mr. Kilkeary being here, will on that, and on any other point respecting which information is desired, be ready to answer any questions that may be put to him. As regards the accounts, I may remark that, though we are only paying the same dividend to-day that we did before, yet there has been a considerable improvement in the working of the company during the half year. The first remark I make upon the accounts is upon the question of outstandings. I have always represented to you that the outstandings in our company formed a very unfavourable feature. I am glad to say we are now improving in this respect. In June, 1871, the outstandings amounted to £15,037; in June, 1872, they amounted to £12,473, being a reduction to the extent of £2500. And, on the authority of our manager, I may say that during the first two months of the present half year they have been still further considerably reduced. As regards our stock, it now stands at £13,542, as against £11,487 at the corresponding period of 1871, showing an increase of nearly £2000. This arises from the fact that we foresaw there would be a rise in the cost of coal, and that in the autumn of last year we laid in stock much more largely than we otherwise should have done. In this way £1500 of the increase is accounted for. As regards the profit and loss statement, I may mention that during the half year under review we paid £87 more for coal, which has produced us £340 more in gas-rental, and £140 more in products. Taking the whole of our expenses in profit and loss, they amount to £200 more, but the receipts as against this amount to £648, showing a difference of £448 to the good, so far as regards the ordinary expenses, but when we come to the extraordinary disbursements, we find the very disagreeable item of "Bad and doubtful debts, £933." It has often been my duty, and the duty of my predecessor in this chair, to point out this unfortunate writing off, and we have often led you to hope that we might see an end of bad and doubtful debts some day. It is my pleasing duty now to tell you that this is the last of what Mr. Nicholson used to call our "dead horse." We are now in a position to assure you that we have written off every bad, doubtful, and disputed debt, that our private rental now stands in a sound and solid position, and that our "Suspense account," which consists of bad debts and doubtful, will be a source of income in the future, inasmuch as some of them may yet be recovered. The only other point to which I wish to draw attention is a matter not referred to in the report—viz., the position of the company in regard to the cost of coal. No doubt you are aware that all gas companies have been greatly affected by the extraordinary and unprecedented rise in the cost of this material. So far as the present half year is concerned, I am happy to say it will have but a very trifling effect upon us. We are shipping coals to Brazil at what we consider favourable prices. We contracted in May last, and the price we arranged was 12s. 6d. per ton, free on board, the present price being from 20s. to 25s., even if they can be obtained at all; so that though we are paying 100 per cent. more than we did in the previous year, we consider that we are very fortunate in the arrangement we have made. I am no pro-

phet, and do not venture to make predictions, but I think it right we should bear in mind that we may not be so fortunate in the future. With these remarks I beg to move the adoption of the report.

Mr. NICHOLSON: I second the motion. I need not add anything to what has fallen from the chairman, who, I think, has satisfactorily explained every circumstance connected with the working of the company. I will only remark that Mr. Kilkeary is here, and ought not to be allowed to leave the meeting without the opportunity of replying to any inquiry you may desire to put to him as to the position of our affairs.

The CHAIRMAN, in reply to several questions, said the cost of the jetty, at present prices, would be about £1500. Up to the present time the tar produced in the manufacture of gas had been almost useless, but the directors had been urging upon the manager the desirableness of employing it as fuel. They had also pointed out to him that during the construction of the Brazilian street railways there might be a demand for it; but at present it was a drug in the market.

A SHAREHOLDER suggested that in that case it might be utilized by being sent over to England.

Mr. NICHOLSON said that would not be practicable; the freight would cost so much that no profit could be got out of it.

Mr. MAUDE asked how it was proposed to pay for the jetty.

The CHAIRMAN said it would be paid for out of capital—out of the money still outstanding.

Mr. MAUDE asked whether the directors could not obtain a supply of coal from the Imperial Brazilian Colliery Company. The Government were using the coal of that company, and there was no doubt it was valuable for steam purposes.

The CHAIRMAN said he had been in communication with the company, and the result of his last inquiries was that they were not in a position to sell coal to this company.

Mr. MAUDE said he thought the company had exhausted all their capital, and therefore he did not see how the jetty was to be paid for.

Mr. NICHOLSON said it was not a fact that the company had exhausted all their capital, though such an inference might be drawn from the way in which the accounts were made out. The capital, it was true, was all called up, but a portion of it was used as working capital, to the extent of about £18,000. The concern ought to be worked with £10,000, or at the most £12,000, so that in reality there was a surplus of something like £6000; but, assuming even £15,000 to be required for working capital, there was a balance available for the jetty, or any other purpose, of £3000.

A SHAREHOLDER asked whether the directors had used Turba in the manufacture of gas.

The CHAIRMAN said Turba was very nearly, ton for ton, equal in result to Boghead, and if they could obtain it dry, and at a moderate price, the directors would use it. But there were one or two difficulties in the working. For instance, it was so very light that it was necessary to put a larger quantity into the retorts than coal, to obtain a similar yield, and this, of course, entailed a greater amount of labour and fuel. But at the present time the parties connected with the sale of the material stated that they could not supply it at a moderate cost, nor yet in a dry state. He believed Mr. Kilkeary had made arrangements to obtain 50 tons of it. It was still being experimented upon, but as yet satisfactory results could not be promised. There had been eight or ten different samples tried at the works, and almost every one gave a different result, and only three out of the ten were satisfactory in a gas-making point of view. It was obtained at a distance from Bahia of about 60 miles.

Mr. RUMBLE thought the bitumen of the West Indies might be made available. He believed it could be delivered at Bahia for 45s. a ton.

The CHAIRMAN said he was about to use Trinidad pitch at Georgetown, and had used it at the Crystal Palace District Gas Company, and obtained about 250 tons for trial. It was very good for gas-making purposes when mixed with coal; but it could not be used alone. The cost was 11s. 8d. per ton free on board at Trinidad. Another source of supply the directors of the company had been trying to open out was the Cape Breton coal; and if they could only get a steamer to run down the coast, from Nova Scotia, it would be very satisfactory. The coal cost 8s. per ton at Cape Breton, and was a good gas coal. It was used by the New York and Boston Gas Companies very largely.

Mr. WRIGHT asked whether it was probable the dispute with the Brazilian Government would be settled soon and satisfactorily.

Mr. KILKEARY said he felt quite sure the company would ultimately receive the full amount shown on the balance-sheet. The steps taken towards a settlement had been very tedious, and it required great delicacy and patience in dealing with the provincial Government of Brazil. The leading advocates of Bahia agreed in the view taken by the company as to their claim.

The motion was then put, and carried unanimously.

The CHAIRMAN moved—"That a dividend at the rate of 10 per cent. per annum on the preference shares, and at the rate of 3 per cent. on the ordinary capital of the company, for the half year ending the 30th of June last be, and the same is hereby declared." He added that the dividend warrants would be issued on the 11th of November.

Mr. NICHOLSON seconded the motion, which was put and carried.

The retiring directors and auditors were re-elected.

Mr. MAUDE asked whether the company had a maximum price for gas prescribed in their concession.

Mr. NICHOLSON said they had. The price now charged to consumers was 20s. 9d. per 1000 cubic feet, and he did not think, even if they could do so, it would be desirable to charge more. In fact, he questioned whether a lower price would not pay better; but the question of price to private consumers was somewhat complicated in the concession with the question of the public lighting. By the increase in the consumption, which Mr. Kilkeary informed him was at the rate of 11½ per cent. last year, he hoped they would be able to meet any difficulty arising from the increased cost of coal.

Mr. KILKEARY said if there should be any permanent increase in the cost of coal a representation might be made to the Brazilian Government to obtain a revision of the maximum price of gas.

Mr. OHREN, referring to the question of tar, said at Rio de Janeiro the whole of the tar was used by the gas company as fuel, with great advantage. If there was a ready sale for coke at Bahia, this company might save a good deal of money by so employing their tar.

Mr. KILKEARY said his attention had been directed to the subject, and he hoped at the next half-yearly meeting to be able to state some satisfactory results.

On the motion of Mr. MAUDE, seconded by Mr. RUMBLE, a vote of thanks was given to the chairman and directors for their services.

The CHAIRMAN acknowledged the compliment.

Mr. MORRISON moved a vote of thanks to Mr. Kilkeary, and spoke of the improvement manifest in the state of the company's affairs since the appointment of that gentleman as manager.

Mr. NICHOLSON, in seconding the motion, said it seemed appropriate that he should do so, having been largely instrumental in the appointment of Mr. Kilkeary. The company were deeply indebted to their manager for his services, and he had no doubt that if things should progress as they were now doing, the company would soon be in a safe and well-paying position.

The motion was cordially adopted.

Mr. KILKEARY said he was very much obliged to the shareholders for this mark of their kindness and approval. He highly appreciated the confidence reposed in him, and would endeavour to continue to deserve it.

CONTINENTAL UNION GAS COMPANY, LIMITED.

The Ordinary General Meeting of the Shareholders was held at the City Terminus Hotel, London, on Tuesday, Oct. 29—LEWIS CUBITT, Esq., in the chair.

The SECRETARY (Mr. R. J. Fennessy) read the following report, and also the statements of account of the working of the company for the year ending June 30 last:—

Your directors are able to regard with satisfaction the result of the year's working, although they cannot conceal from themselves that this result is not what it would have been had external circumstances been more propitious. The interval elapsed since the close of the late war has been too short to admit of a complete return of the French stations to their former prosperity, but these have, on the whole, rendered perhaps better returns than might have been hoped for. Strasburg, too, has been making great progress towards its former figures, and there cannot be any reasonable doubt but that during the coming season the returns from this city will surpass what they had ever previously attained. In Italy the progress of the stations has been in all cases good, and in some excellent; but the remittances from that country have been materially prejudiced by the unfavourable rate of exchange. The net general result, however, is an increase not only over that of last year, but also over that of the year immediately preceding the war; and from the accounts received since the 30th of June the improvement is being maintained. As the high price of coals will probably have caused anxiety among the proprietors, your directors have the gratification of assuring you that the stocks at the stations were never larger than they are now, and that existing contracts, at comparatively moderate prices, will carry us through the current financial year ending in June next. The increase in the price of coke partly meets the enhanced cost of coal which we have had to pay, and your directors are also giving their very serious attention to the utilising of modern inventions for turning the other sub-products to more substantial account.

The new work executed and undertaken during the past year has been as follows, viz.:—

Milan.—New bench of double retorts. Addition to the purifiers, condensers, scrubbers, and exhausters.

Genoa.—Additional retort and purifying power, also increase in diameter of mains.

Messina.—Considerable extension of mains, and an addition of over 300 public lamps.

Strasburg.—Completion of the work of extension and improvement commenced before the war.

Rueil.—Completion of the gasholder at Chaton, also commenced before the war. The village of Croissy has been added to the district lighted by the works at Rueil.

It was with the object of providing for this and other work, which will yet have to be undertaken in order to keep pace with the constantly increasing demands upon the company, that the board, in July last, made a further issue of 10,000 new shares. The whole of the 10,000 were offered to the proprietors, and readily taken up, leaving only a small balance of 820 shares, which were sold in the market at a premium for the benefit of the company.

The director who retires by rotation is John Fisher, Esq., who, being eligible, offers himself accordingly for re-election.

The available balance of the year's profit and loss account, including £4785 0s. 2d. brought forward from last year, and after providing for sinking-fund, is £50,931 13s. 3d. Out of this you have already received an interim dividend at the rate of 7 per cent. per annum on the ordinary shares, and at the same rate on the preference shares for the six months ending the 31st of December last. Your directors have further resolved to declare a dividend at the rate of 7 per cent. on the preference shares for the six months ending the 30th of June, and for the same period on the ordinary shares at the rate of 7 per cent. per annum, free of income-tax, leaving £9506 9s. 3d. to be carried forward to next account. The dividend will be paid as usual on the 4th of November.

The CHAIRMAN: Gentlemen, before I ask you to approve of the report and accounts, I should like to say a few words in justification of that request. The affairs of gas companies generally have, as you doubtless are aware, been much disturbed during the last year from causes over which the directors have been able to exercise no control. We have ourselves suffered to some extent from this state of things. The price of coal has been one of our troubles, but I believe we have weathered it so far, I will not say with great ability, but certainly with great earnestness of attention to your interests. I am happy to say that we have made a better year than we ever made. Our profits were larger last year than at any previous period. I stated to you at our meeting in the month of May that I hoped on this occasion we should be able to declare a larger dividend; and I felt justified in doing so. And although, with the sanction of the board, I am now about to declare a dividend at the same rate only, it is not that we have made less money, or are in worse circumstances. On the contrary, I believe we never have been so prosperous. You all know that in past times we were assailed almost more than any other company. We have never had a bed of roses in taking up the affairs of this company; and now and then we are a little disturbed by amateur directors, who tell us we manage the thing very badly, because we do not pay you 12 per cent. All I can say is we would give you 20 per cent. if we could; we would enrich you beyond the reach of avarice, if it were in our power; but we wish to be honest and just, and to make one year consistent with another. We, therefore, declare a dividend to-day of 3½ per cent., making 7 per cent. for the year, and to carry over a balance of nearly £10,000 as undivided profit to be called upon if needful, or to be hereafter divided as we may have occasion. With markets in their present doubtful condition it is not wise or prudent to draw out our last shilling. With regard to our supply of coals, I may say that we have arranged up to July next; therefore I think we can see our way clearly in this respect. Our stations are increasing in the number of consumers, and I believe we have got through the greater part of our troubles. The only thing that now causes anxiety is the accidental circumstance of the inundations in Italy; though I am happy to state that we have not suffered from them anywhere at present. The state of affairs in France has improved, so that there seems to be an era of prosperity before us which I trust we may all live to enjoy. The importance of keeping our financial affairs in a safe and sound position, so as to enable us to borrow money at a lower rate of interest than we should have to pay as dividends, has not been lost sight of by us, and on that account we have thought it prudent to increase our capital. I believe there has been some murmuring amongst the proprietors about this; I have not heard it myself, but I have been told of it. I do not know why there should be. All the shares were taken up except a few which were allotted to trustees who had no money for the purpose. These few were subsequently sold at a premium for the benefit of the concern, and the next accounts will show what they produced. The labour market, I am sorry to say, is very much against us, as it is against every company, and the exchange is not so favourable as we could desire. If we could only have things so ordered as poets dream, we could give you such dividends as you never conceived of. But this cannot be, and we can only go on steadily, taking the utmost care of your interest, and exercising the most rigid economy consistent with the efficiency of the concern, so as to return to you the largest amount of profit which is practicable. With these remarks, and hoping that the statement of our affairs will be satisfactory to you, I move the adoption of the report.

Mr. FAWCETT seconded the motion.

A SHAREHOLDER remarked that, as the accounts of the company were read at the meetings in detail, and in the presence of reporters, he could see no reason why they should not be printed and circulated among the proprietors. It might be said that the fullest opportunity for inspection was afforded at the office, but all the proprietors did not live within the sound of Bow bells, and could not avail themselves of the privilege. He had no desire to impugn the general management of the company, and only sought for a more clear understanding of its position. It was stated by the chairman that the question of the supply of coals had been treated by the directors in a very advantageous manner, and that the numerous stations of the company were all in a satisfactory and prosperous condition. And yet in the face of these facts the dividend now declared was at the rate of 1 per cent. less than at the corresponding period of last year.

Mr. FAWCETT: That is not correct.

The CHAIRMAN said the request of the honourable proprietor, for the publication of the accounts of the company, had been brought before almost every annual meeting for many years past, and he was sorry to say he could not encourage the idea that the directors would ever consent to such an arrangement. The proprietors had every facility for examining the accounts if they desired to do so, but it had always been the practice to refuse their publication because the directors believed it would be prejudicial to the interests of the company. Gas companies in England, working under the authority of Acts of Parliament, were required to publish their accounts, but that was altogether a different thing from a company working abroad without any such protection. Such a publication could in no way be beneficial, and, on the contrary, might exercise a most prejudicial influence, and be the means of provoking discontent or creating competition. For his own part, as he had said before, he would withdraw every shilling he now had invested in the undertaking if so mistaken a policy were adopted. No doubt all of them, as honest, straightforward men, would be quite content that the proceedings should be known to the world, but they were bound to see that they did not injure themselves by any course recommended for adoption. With regard to the dividend, he only wished the directors could have declared a larger dividend than they did last year, and certainly in the spring everything appeared to favour the expectation that they would be able to do so. But subsequent events, which could not then be foreseen, prevented. The directors had done their best to cope with the difficulties to which they had been exposed, and he believed they had been successful. The honourable proprietor was mistaken in saying the dividend now declared was less than last year; the amount was exactly the same, but then the directors had to borrow from undivided profits of previous years; this year they had been able to refund part of that amount, and provide a nest-egg for the future.

The motion was then put, and carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. WHITE, the retiring director, Mr. Fisher, was re-elected to a seat at the board.

Mr. FISHER returned thanks for his re-election.

On the motion of Mr. STOKES, seconded by Mr. SOLOMON, the retiring auditors, Mr. Backler and Mr. Hadland, were re-elected.

A SHAREHOLDER asked whether the chairman could give the meeting any information respecting the patent or the air-gas schemes.

The CHAIRMAN said he could not say he was unacquainted with these new projects; indeed, for the last 30 years he had been pestered night and day with communications in reference to such things. Whether there was anything in the schemes just alluded to he was not prepared to say, but the shareholders might rest assured that no improvements brought before the public would be lost sight of by the directors. As far as he was aware there was nothing in patent gas or air gas with which he need trouble the meeting.

On the motion of Mr. STOKES, seconded by Mr. SMITH, a cordial vote of thanks was given to the directors for their careful management of the affairs of the company.

The CHAIRMAN, in acknowledging the vote, said: We have endeavoured to deserve your confidence, and I am pleased to find that we possess it. Although, perhaps, one or two of our stations have not been so productive as others, this is only what we must expect. If you are engaged in many transactions, they will not all prove equally advantageous, but then the advantages of one compensate for the less favourable returns from others. I assure you we do not neglect any; we believe they are all capable of improvement and increase, and it is our earnest desire and purpose to develop them to their fullest extent.

QUALITY OF THE GAS SUPPLIED TO THE METROPOLIS.

Dr. Letheby, the chief gas examiner appointed by the Board of Trade, has recently submitted his quarterly report on the illuminating power and chemical quality of the gas supplied to the metropolis by the Chartered, the Imperial, and the South Metropolitan Gas Companies, from which it appears that the maximum, minimum, and average illuminating power of the gas at each of the testing-places has been as follows:—

Illuminating Power in Standard Sperm Candles.

	Testing-Place and kind of Gas.	Max.	Min.	Average.
Common Gas.	Chartered Company. Beckton, North Woolwich	19·0	16·1	17·39
	Chartered Company. Cannon Street, City	17·9	15·8	17·01
	Chartered Company. Friendly Place, Mile End	18·6	16·7	17·45
	Chartered Company. Arundel Street, Haymarket	19·7	16·3	17·96
	Chartered Company. Millbank Street	17·9	16·8	17·35
	Imperial Company. Oakley Square, Chelsea	18·8	16·0	17·46
	Imperial Company. Camden Street, Camden Town	17·3	14·6	15·85
	Imperial Company. Graham Road, Dalston	18·6	14·9	16·59
	South Metropolitan, Hill Street	17·0	14·5	15·71
Cannel Gas.	Chartered Company. Millbank Street	30·3	25·4	27·10
	Chartered Company. Arundel Street	27·9	23·0	25·12

As regards purity, Dr. Letheby reports that the gas of all the companies has, except on two occasions, been constantly free from sulphuretted hydrogen—the two occasions being the 3rd of August and the 26th of September, when the gas of the South Metropolitan Company, at Hill Street, Peckham, was found to contain traces of this impurity. The maximum, minimum, and average amounts of sulphur in other forms than this have been as follows:—

Grains of Sulphur per 100 feet of Gas.

	Testing-Place and kind of Gas.	Max.	Min.	Average.
Common Gas.	Chartered Company. Beckton, North Woolwich	23·3	7·3	11·19
	Chartered Company. Cannon Street, City	19·5	6·9	10·50
	Chartered Company. Friendly Place, Mile End	11·5	2·2	6·36
	Chartered Company. Arundel Street, Haymarket	15·4	7·0	9·94
	Chartered Company. Millbank Street, Westminster	28·3	17·7	23·37
	Imperial Company. Oakley Square, Chelsea	38·2	24·0	32·64
	Imperial Company. Camden Street, Camden Town	35·9	16·1	26·74
	Imperial Company. Graham Road, Dalston	35·2	22·3	27·68
	South Metropolitan Company, Hill Street	42·6	26·0	33·40
Cannel Gas.	Chartered Company. Millbank Street	19·5	8·5	15·00
	Chartered Company. Arundel Street	35·0	19·4	25·36

It appears that with the exception of one day at Beckton, the amount of sulphur contained in the common gas at Beckton, at Cannon Street, at Friendly Place, and at Arundel Street, and in the cannel gas at Millbank, has not exceeded 20 grains per 100 cubic feet during the whole of the quarter, and that for the last two months the common gas of the Chartered Company at Beckton, at Cannon Street, at Arundel Street, and at Friendly Place, has contained less than 15 grains per 100 cubic feet, the averages for this period being 10·57 grains, 9·71 grains, 9·83 grains, and 7·03 grains respectively. These results are very satisfactory, as they show that with the care used by the company in the manufacture of the gas supplied to these several places the proportion of this impurity can be kept down to 15 grains per 100 feet.

The amount of ammonia in the gas of the several companies has always been below the quantity (2·5 grains per 100 feet) prescribed by the referees; and it has averaged from 0·0 grains per 100 cubic feet of the gas at Hill Street, Peckham, to 1·02 grains at Arundel Street.

Dr. Letheby has drawn the attention of the Corporation of the City of London, as well as of the Metropolitan Board of Works, to the irregularities of the returns of the daily testings at several of the testing-places, saying that it is of the greatest importance that all the daily testings should be properly and regularly performed, in order that the public interests may be served, and the obligations of the Acts of Parliament fulfiled.

PUBLIC LIGHTING AT DROGHEDA.—The streets of this town are now lighted with oil instead of gas, in consequence of the gas company having found it necessary to raise the price of gas.

SUNDAY LABOUR IN GAS-WORKS.

On Wednesday evening last, a crowded meeting of gas stokers and others employed in the several gas-works of the metropolis was held in the Cambridge Hall, Newman Street, Oxford Street, "to take into consideration the abolition of Sunday labour, and other business connected with gas-works"—Mr. LLOYD JONES in the chair.

The CHAIRMAN, in opening the proceedings, said he had consented to the wish of the committee that he should preside, because he felt that the object sought by all present was right and proper. Considering that persons belonging to almost every trade were asking for improved conditions of labour, this was precisely the time for those engaged in gas-works to seek to remedy what was confessedly wrong in their position. If he was correctly informed, the majority of those present worked in alternate shifts of 12 hours, and this system was continued from one year's end to the other, including Sundays as well as week days. They were, therefore, an exception to the general rule, for in every trade with which he was acquainted, Sunday, at all events, was a day of rest, as it ought to be, except where labour on that day was absolutely necessary for carrying on the business of society. When he spoke thus he wished it to be distinctly understood that he did not put it upon religious grounds at all—he put it on the physical necessity for periodical rest from constant labour on the part of man in whatever occupation he might be engaged. So strongly and universally had this been felt, that there was no country in the world, and there was no religious community in the world, which had not made provision for periodical rest from the labour of life. Such being the case, gas stokers had a right to put in their claim with all others who were required to earn their living by the sweat of their brows; they had a right to say to the public generally, and to the directors of gas companies in particular, "You ought not, unless it is absolutely unavoidable, to require us to give that day to labour which the rest of the world gives to repose." He had heard it stated that in the operation of gas-making a certain number of persons must always be employed on Sunday to keep up the heats in the retorts, and in that case they must submit to what was an inevitable consequence. He was sure that those now present had no disposition to strike, and no desire to quarrel with their employers, or to force them to do that which would be a loss to them and an injury to the public. They were anxious to have their own position improved without inconvenience or injury to any one, but they had a perfect right to say to those who managed the works in which they were employed, and to the shareholders whose property these works were, as well as to the public, for whose convenience they toiled, that such conditions of labour should be established, that not one hour more than was positively necessary should be devoted to their service, while all other workmen were at rest. He was told that a large proportion of shareholders in gas-works were ladies and clergymen—*i.e.*, persons who were not disposed to invest money in risky speculations, and who, therefore, bought shares in gas-works, receiving, as he supposed, a steady return on their investments. Now, upon ladies and clergymen they had no more claim than upon other classes of society, but he thought he might safely assert that clergymen and ladies who had thus embarked their capital would, as a rule, be found favourable to such a curtailment of the hours of labour as would leave the men engaged in gas-works the opportunity of what they would call the Sabbath rest. If a proper appeal was made to these people, if the press would give voice to the representation of the labourers in these companies, and would, moreover, point out that there was absolutely no necessity for the whole of the work which was exacted from them on Sunday, he was quite sure there would be a disposition on the part of gas shareholders to accord this right, and that directors, having pressure put upon them, would find it convenient to listen to the claim. He urged, therefore, upon all present, that they should leave no means untried to get into friendly communication with their employers, and to convince them, as he believed they could do, that the interests of the companies would not be injured by the concession they sought to obtain.

Mr. WEBSTER (secretary of the Amalgamated Gasmen's Association) then moved the following resolution—"That this meeting of the gas workers of London is of opinion that the time has arrived when they should make a determined effort for the complete abolition of Sunday labour, where such abolition is practicable; and this meeting is also of opinion that the pay should be fixed at the rate of time and a half for Sunday labour wherever its abolition is impracticable." He referred to the laborious nature of the stoker's work, and said in the majority of cases the men never saw their children from one week's end to another, except when they were in bed and asleep. They, therefore, required the rest of Sunday, not only for the refreshment of their exhausted nature, but for the cultivation of domestic affection, and the enjoyment of home comforts. In forming themselves into a union, they had no desire or intention to injure their employers, but simply to protect their undoubted rights. He hoped the real nature and cause of the union would be understood, and that every member of it would act in a straightforward, manly sort of way. Let them make it a rule that no advantage should be taken of their employers, and that they would never do anything of which they were ashamed. He was sure it could not be doubted for a moment by any one who thought upon the subject, that the laborious and continuous work of gas manufacture was injurious to the health of those engaged in it, and that it was desirable, if possible, to remove a portion of the burden from their shoulders. This could only be accomplished by unity of action amongst themselves. With reference to statements made recently in some of the newspapers, he declared emphatically that no strike had ever been intended, and that "the little mishap at Fulham and Hackney" was solely occasioned by a disrespectful answer which they received from an officer of the company. He hoped such a thing would never occur again. Their rule was that no man, or body of men, should act without the sanction of the central committee, or if they did, they would not be protected by the rules of the society. The public might rest well assured that there was no intention to strike amongst the stokers of London. The progress of their cause was most favourable, and he felt bound to thank the directors of the companies for what they had already done, at the same time hoping they would do a little more for the men. There was one point which ought specially to be urged upon the directors, and that was the necessity for providing better ventilation in the retort-houses. As at present arranged, the men were exposed to needless annoyance from the condition of the atmosphere in those houses, and they suffered also much in health by consequence.

Mr. GEO. BARKER (Independent Gas-Works) seconded the motion. He also referred at some length to the laborious and exhausting nature of their employment, and compared the pay which they received for it with that which other labouring men, engaged a much less number of hours, and under far more favourable circumstances, could command. It had been said, in answer to their claims, that they were not skilled workmen. That might be true; but he would ask, Could any skilled workman do their work? And it must be remembered that the work was not only extremely laborious, but that it had to be performed continuously, Sundays and week days, night and day alternately, and in an atmosphere which was most oppressive and injurious to health. Surely, it was not unreasonable that they should ask for the rest of the Sabbath that they might refresh their energies, and have a short period for the improvement of their minds and the enjoyment of their homes. He was glad to acknowledge that as far as matters had yet gone, the directors had met the men in the most friendly way, and had conceded pretty nearly all that was asked for. They did not open their mouths too wide at first, but no doubt they would want a little more by-and-by. Under the existing state of things, with such unremitting labour, how was it possible for those of them who were fathers to look after the

training of their children, and see that they were brought up in the right way? In some cases, all a man heard of his child's voice was when the little one woke up during the night and asked for a drop of water. The effect of the present united movement was so far satisfactory, that where Sunday labour had not been actually abolished in compliance with their request, the directors had promised that it should be so soon as the necessary preparations for the purpose were completed. He wished to impress upon all present that as they had started the union by themselves, they should stand together and have no connexion with other bodies, and that they should have no hard and fast rule applying to their union. The nature of their work was so different from that of other labourers, that the rules of their union must be made pliable, and they should not expose themselves to outside influences. Almost every person present had heard of the turn-out at the Hackney works. He felt that that turn-out was a great misfortune on both sides, and both sides, he believed, were responsible for it. The men employed in those works had sent in a memorial asking for twelve hours off on one Sunday in two. They had received no answer to their request, and on the Saturday night they met for a reply, "yes" or "no." They would have been satisfied with any reasonable concession, but they were told, "You will not get what you want, and you may stop or go," or words to that effect. It was that disrespectful answer which caused them to turn out, for they felt that, however humble their position, they were entitled to respectful treatment when they made a reasonable request. He was happy to say that little affair had blown over, and that, in fact, some good had come out of it. All honour to the men who were highest in command in that company. When the delegates from the stokers met the directors of the Imperial Company, they found that they were in the presence of gentlemen. They did not know that such tyranny had been exercised upon the men, and they gracefully conceded all that they possibly could to carry out their wishes. For his own part, he found, whether in gas or water works, that the lowest in command were always the most tyrannical, and therefore his advice was, go to the fountain-head at once, if you want to have justice. Referring to an article upon the Hackney strike which appeared in the *Standard* newspaper, he said he felt the men were under an obligation to the writer, inasmuch as it brought their cause before the public; but it contained many misstatements, and was evidently written by one who looked only at one side, and that the master's side of the question. He had felt it his duty to publicly reply to that article, and he challenged contradiction to any and every assertion he made thereon. The stokers had been threatened that if they took too much upon themselves the companies would introduce the "iron man." But they would have to build the iron man before they could introduce him, and when that was done the stokers would put to him this question in dumb motion: "Are you going to join our society? If you don't, we are not going to work with you." At the same time he counselled all around him "to act straightforward; do nothing that will injure your employers, and if asked to take part in any dirty work, throw up your employment, so that whether you stand or fall you need never be ashamed to look your employers in the face." He believed that there was some misapprehension amongst their masters that there was going to be another strike. He wished it to be distinctly understood that no such thing was contemplated, and that it was intended in everything they did to act honourably. In conclusion, he desired publicly to thank the directors, one and all, of the various gas companies for the manner in which they had met the men, who, though they had not obtained all they wanted, had gained as much, perhaps, as they ought to expect up to the present time.

Mr. BURNETT (Fulham works) supported the resolution, and dwelt upon the moral and social aspects of the question. The stoker's whole time, he said, was so continuously occupied with laborious toil that he had not a moment to devote to his own improvement, nor to the training of his children, nor to the discipline of his home. In asking for Sunday rest, they only asked for 12 hours to themselves, and not for the whole 24. He was bound to say that the directors had met them in the most gentlemanly way, but the directors had a pressure upon them from the public. To the public, therefore, the men must appeal, and make their case known. It was far from their desire to strike. Where was the utility of striking with an empty cupboard? They must try moral suasion, and seek to gain public sympathy, and he felt sure that when the urgency of their claims was known, they would have it. In the present day, when boards of education were being established, and legislation of all kinds was being brought to bear upon the condition of society, it was hard that the poor stokers should come in for so scant a share of benefit. But it was a fact that their incessant labour deprived them of the advantages which others enjoyed; it weighed heavily upon mind as well as body, and made the men callous and indifferent to all reforms. He believed that if Sunday labour were abolished, they would all be better and more successful men. He formed one of the deputation which waited upon the directors of the Imperial Company, and he bore cheerful testimony to the admirable spirit in which he and his brother-workmen were met. Mr. Richards, the governor, said: "We do not wish that Sunday labour should be followed out, and we have called you here to see if we can adopt means for the abolition of it." This was taking a view of the case which was highly creditable to the directors, and which was very satisfactory to the men. He was glad to say also that the engineers had promised the same thing as far as practicable.

Mr. WALLACE (Kensal Green works) spoke in the same spirit and to the same effect, and said he looked forward to the time when, Sunday labour abolished, the men engaged in gas-works would have an opportunity to cultivate their own minds and to educate their children, instead of leaving them, as at present, to wander about the streets exposed to all the corrupting influences of bad companions, and that in the final result "the humble domicile of the English gas stoker would be a picture of peace, contentment, and good order."

The motion was then put to the meeting, and declared to be carried unanimously.

The announcement was received with loud and prolonged cheering.

Mr. KING (Bow Common works), in proposing a vote of thanks to the chairman, took occasion to say that, up to the present time, the social position of the stoker had been one of the lowest. A stoker, working all the week, and enjoying no rest on the Sabbath, lost all interest in public affairs. Incessant toil was his portion, and while other workmen were at church, or taking recreation, he had no alleviation of his lot. What could be expected of him but that he should become careless as to any intellectual or moral training? He had no encouragement to seek, as he had no chance of gaining, instruction. He could attend no club or institute; he had no time for teaching his children. What, then, was his resource for enjoyment? When he left off work, the first thing he felt was thirst, and to the public-house he went to quench it, where he often spent money which deprived his home of comforts which his family ought to possess. Looking at the question in a religious point of view, the stoker was required habitually to break the fourth commandment, the responsibility for which surely rested upon his employers.

Mr. BROADHURST (secretary of the Masons Union) seconded the motion, and said that when the Sunday labour question was settled the men must go in for three shifts a day instead of two.

The motion, on being put to a show of hands, was very heartily responded to.

The CHAIRMAN acknowledged the vote in a lengthy speech, in the course of which he urged upon all present "thoughtful organization," if they would secure "peaceful progress."

The proceedings, which had lasted upwards of two hours, and had been conducted with the utmost decorum and good humour, then terminated.

EDINBURGH WATER SUPPLY.

At a Meeting of the Water Trustees, on the 21st ult., the Works Committee reported that they had taken the opinion of counsel on the remit to them, viz., to institute proceedings under the Municipal Corporations (Borough Funds) Act, to obtain the consent of the owners and ratepayers to the carrying out of the Moorfoot scheme. The opinion of counsel was that the Act in question did not apply to Scotland, and that the trustees were not a governing body in the sense of that Act. Under these circumstances they were unable to carry out the remit. After some discussion upon the report, it was agreed, on the motion of Mr. Wormald, that "this meeting is of opinion that the scheme to be recommended to the ratepayers should be to apply to Parliament (1) for additional powers to check waste, and (2) to provide an additional reservoir or reservoirs in the Glencorse Valley."

The CLERK read the following reports by Mr. Leslie, C.E., and Mr. Coyne, C.E., in regard to the prevention of waste:—

BY MR. LESLIE.—In accordance with instructions received from the trustees, Jan. 23, 1872, to furnish a report on the amount of waste discovered and prevented, I have prepared the following tabular statement, which shows the results of all the observations taken during the present year. Wherever it was practicable, meters were placed on the main-pipe in the streets, and notes were taken of the quantity which they registered as having been delivered through them every 24 hours. After having ascertained the population of the district supplied by this meter and the quantity consumed per head, all the apparatus, pipes, valves, cocks, &c., were thoroughly overhauled and put in perfect repair. During all this time the observations on the delivery of the meter were carefully continued, and, as will be seen by reference to the table, a considerable saving was generally effected immediately after the repair to the house apparatus. It is true that this saving did not in every case continue, and this goes to show that house-to-house visitation, in order to be really efficacious, must be repeated at short intervals, and by careful inspectors. A reference to the accompanying table will show that while in most districts a considerable saving was effected by the careful attention of the inspectors during the time that the district was under consideration, several districts have increased their consumption in spite of all the precautions which were adopted. Among the districts where a considerable saving was observed to have been obtained by the time when the meter was removed, I may point to Patriot Hall, where the consumption was reduced from 40 to 19 gallons per head per day. Another good illustration is Beaumont Place and Forbes Street, where we find a reduction from 32 to 15 gallons per head per day. On the other hand, it is observable that in several districts the consumption seemed to increase in spite of the fact of all the apparatus having been inspected and put in proper order, as, for instance, Clarendon Crescent, where the consumption has risen from 42 gallons to 69 gallons per head per day. This large consumption may either be accounted for by the fact that most of the modern houses of this class are fitted with at least one, and in many cases with two fixed baths, and are also provided with hot water services all through the house, which is quite a sufficient reason for believing that a very large quantity of water may very easily be consumed, even although all the pipes and other apparatus may be in perfect order. Or undiscoverable waste may possibly be going on owing to fracture of the main-pipes in the streets, from which the water may easily find its way into the street sewers and thence to the sea without being observed. But in reference to this supposed and possible source of waste, I may state that from careful observations which were made in the Royal and Regent Terrace districts, where the consumption amounted to between 50 and 60 gallons per head per day, it was found that the street pipes were all perfectly tight, so that no waste could have been proceeding from them, while, at the same time, all the house apparatus had been inspected, and found to be in the most perfect order. As there can be no doubt that the best time to detect waste of water, either from broken mains or faulty cisterns and other apparatus, is during the silence of the night, I would beg to repeat my recommendation that the assistance and co-operation of the night-policemen should be obtained, and that they should be requested to take note of and report any locality where the sound of water wasting may be heard. If their assistance cannot be obtained, it will be necessary that an additional staff of inspectors be employed for this special night duty. In conclusion, I have to state that, with the present habit and customs of the people of Edinburgh, and with the continued use of the style of apparatus which is everywhere to be found throughout the city, it will not be possible materially to diminish the consumption of water, but that with an increased staff of inspectors and careful house-to-house visitation, periodically repeated, a good deal may be done to stop that waste, which in many districts is found to be considerable, and which is owing to the existence and use of faulty apparatus and leaky pipes.

Notes on Average Consumpt in Gallons per Head per Day.

District.	Before inspection.	Greatest consumpt.	Least consumpt.	When Meter taken off.	Beginning of Oct. 1872.
India Place	23	23	15	21	—
Jamaica Street	29	29	15	18	—
William Street and Stafford Street	35	53	29	53	—
Patriot Hall	40	40	15	19	—
Blacket Place	51	51	35	37	—
Bellevue Place	31	40	31	40	—
Rutland Square and Street	41	41	26	27	—
Beaumont Place and Forbes Street	32	32	15	15	—
Brougham Street	27	36	22	29	—
Leith Street	28	30	23	23	—
Regent and Royal Terrace	53	60	34	40	—
Crosscauseway	18	22	12	20	—
Whale Brae	11	13	9	13	—
Trinity Road	45	51	43	—	47
Wardie Road	46	60	35	—	54
Forres Street	53	68	30	—	36
Grosvenor Street	65	69	23	—	44
Clarendon Crescent	42	118	36	—	69
Glenogle Park	29	29	16	—	28
Vanburgh Place	31	40	30	—	33
Portobello	38	37	28	—	28
Buckingham Terrace	51	136	48	—	59

BY MR. COYNE.—*Distribution.*—The distribution has been much improved within the last six months in many places where there were very old pipes, such as in Dean Street, Elbe Street, Kirkgate, west division of Queen Street, south division of Hanover Street, Newington Terrace, Straiton Place, Wellington Street, Laurie Street, Coatfield Lane, and many other places, where the pipes were either corroded or inadequate to convey a sufficient supply for the inhabitants, besides a considerable extension of pipeage in new streets, and an additional 6-inch pipe in Pilrig Street for North Leith. The whole number of pipes laid from January to September was 2781, or 8343 yards. Of these, 488 were 6-inch pipes, laid in Pilrig Street; 137 were 4-inch pipes, laid in Beaumont Place and Dean Street to replace old 3-inch; 2055 were 3-inch pipes, laid in various places, both as new mains, where pipes were not previously laid, and to supply the place of old lead pipes; and 101 old 2½-inch pipes, cleaned and relaid in lanes and closes in which old ½ or 1-inch lead pipes were doing duty previously. While this is undoubtedly a great improvement, and giving great satisfaction in the places relieved, there yet remains a great deal to do, not only in relaying, but remodelling the system of pipeage. That, however, is a work of considerable expense and time, and owing to the enhanced value of pipes as compared with a few years ago must be done gradually.

House-Fittings.—As regards the fittings to be put into new houses, there is no difficulty in dealing with them, for the trustees have sufficient power to compel whatever fittings may be desired. It would be a wise thing were the trustees to supply and lay down and maintain, as a portion of their main-pipes, all connexion-pipes from the main-pipes to the stop-cock to be placed in the pavement, and to supply and maintain such stop-cock and surface-box—making a charge for the same in the first place. This would give great security for the strength and sufficiency of the pipes and stop-cocks, which at present are of a very inferior description; and indeed many proprietors do not know whether these stop-cocks and tobbies or surface-boxes belong to them or to the trustees. Hence they are frequently neglected and in a state of disrepair. It would be desirable and a great saving both to the builders of new houses and to the trustees, before laying the internal pipes, to ascertain the pressure that the pipes would likely be subject to, so that the danger and annoyance of "burst pipes" might be removed as much as possible by having a pipe of sufficient strength and proportionate to the pressure as regards its carrying capacity. If this were acted upon, not only efficiency, but economy in the cost of lead pipes would be effected.

Cisterns and Waste-Pipes.—The position of the cistern is in every case the difficult point to deal with as regards easy access for inspection, and a good outlet for the waste-pipe. It is found that architects are wholly to blame for the mode of arrangement which prevails. Plumbers are perfectly ready to put the cisterns in any place, but are bound to execute their work in terms of the plans and specifications of the architects, who do not give the matter of internal arrangements sufficient consideration. It fre-

quently happens that while parties are perfectly willing to place the waste-pipe in such a position as to make it a tell-tale pipe, it is not practicable to do so owing to the manner in which the cistern is placed. The waste-pipe as a tell-tale pipe, and to be really useful as a preventive of waste, should be placed in such a position as to be, if allowed to run, a source of annoyance to the parties; and hence before fittings and cisterns are placed in any building, the position of the waste-pipe should be pointed out either at the building or on the plan or section of the building, and approved of.

Water-Closets.—The water-closet should not be in connexion with the supply-cistern for the house if possible. This would be an excellent sanitary improvement on the present system of piling cisterns and water-closets in tiers one above the other. If this were adopted, a small flushing-cistern such as one made by Stone and Co., of London, or any similar one which would give from one and a half to two gallons in one shot to flush the closet, could be employed. This system of flushing would effectively prevent the enormous waste that at present is found to be due to the chief cistern in connexion with a faulty water-closet valve, and also giving facilities to stupid people to tie up the water-closet handle. The water-closet, as at present, is not only an undue consumer of water, but is very frequently a nuisance, whereas the flushing-cistern indicated would economize water and do its work more effectively without being a nuisance.

Check Stop-Cocks should be placed on all ascending pipes to cisterns and descending pipes to kitchens, so that nose-cocks and ball-cocks could be repaired without emptying the cisterns. This useful precaution is now being carried into effect by the Superintendent of Works in all new fittings. All pipes should be subject to inspection and test of standard gauge strength before being put into the houses.

Fire-Cocks.—All fire-cocks should be sealed, so as to prevent parties from using the water from the fire-plugs in their yards or premises; and a penalty of £5 should be imposed wherever the seal was found to be broken, except in case of fire.

Old Houses.—In the fittings in old houses, it would be desirable to put in a tell-tale pipe independent of the present waste-pipe, but to be placed one or two inches below the top of the waste-pipe, so as to give warning when the ball-cock would be out of repair. This tell-tale pipe would not cost more than a few shillings for each cistern. It could be easily led into a position so as to be seen. This could be done in most places, even in the best houses, without doing any serious damage to cause expense. In almost all cases there could also be placed in conjunction with the present cistern a flushing-cistern for the water-closet, to act as a preventive of waste from the water-closet. The expense of this latter alteration, including the waste or tell-tale pipe, would not be much per water-closet and cistern. An experiment might be tried in a small district, on which a meter would be placed so as to test its working exactly.

The reports were ordered to lie on the table, to be considered along with Mr. Ayres's report.

The Clerk read a letter received from Mr. Hawksley, intimating Mr. Ayres's acceptance of a remit to inquire and report into the prevention of waste in Edinburgh. The Works Committee were instructed to meet Mr. Ayres, and, after hearing his views, to call a meeting of the trust and submit his proposals for consideration.

Middleton and Tonge Gas Supply.—The Improvement Commissioners, at their meeting on the 29th ult., refused, by a majority of three, to confirm that portion of the Gas Committee's minutes which related to the discontinuance of discounts to gas consumers.

Buenos Ayres Mutual Gas Consumers Company.—On Monday, Sept. 23, the municipality despatched the contract for the lighting of the city in favour of the Mutual Gas Company. The contract is for not fewer than 4000 lamps, and the price 110 m/c per month, or say £10 15s. per lamp per year, for 18-candle gas, the burners to be No. 3 lava. The contract is for 10 years from March, 1874.

Lamplighting at Aberdeen.—It is stated that the Lighting Committee of the Police Department of the Town Council of Aberdeen have resolved to recommend that the number of lamplighters be reduced from 19 to 18, lighting with the rod now enabling each man to do more work; that the wages of the three foremen be advanced from 16s. to 17s. per week; and the wages of the other 15 men be advanced to 16s. per week—four at present having 15s. and twelve 14s. 6d.

The Institution of Civil Engineers.—The first ordinary meeting of the fifty-sixth session of this scientific society will be held on Tuesday, the 12th of November, at the house of the institution in Great George Street, Westminster. The members have been reminded of the obligation entered into on election, to promote in every possible way the objects for which the institution was founded in the year 1818, and was incorporated by Royal Charter in 1828—viz., "for the general advancement of mechanical science, and more particularly the acquisition of that species of knowledge which constitutes the profession of a civil engineer," as defined in the said charter. At the ordinary meetings papers are read descriptive of some engineering work, or on some branch of the allied sciences, and afterwards the merits of the communications are fully and freely discussed.

Theft of Gas-Pipes.—At the Sheriff Summary Court, Edinburgh, on the 28th ult., James Green was charged with having stolen three cast metal gas-pipes, weighing 5 cwt., valued at £3. On the 4th ult., the prisoner entered a yard in West Port, and yoked his horse to a van belonging to Messrs. M'Donald and Weir, ironmongers, Grassmarket. He drove the van to East London Street, and placed in it the three gas-pipes, which belonged to the Edinburgh and Leith Gas Company. While going along the street the horse fell, and one of two men who came to assist recognized the pipes in the cart as those which had been lying in the street. The police were then sent for, and Green was given into custody. The charge was found proven, and the accused was sentenced to sixty days' imprisonment.

Gas, Water, and Sanitary Works Construction Company.—At an extraordinary general meeting of the members of the above-named company, duly convened, and held at the London Tavern, Bishopsgate Street, in the City of London, on the 17th of October, 1872, the following extraordinary resolution was duly passed:—"That it has been proved to the satisfaction of the company that it cannot continue its business, and that it is expedient that it should be dissolved and wound up." We understand that the above paragraph, extracted from the *London Gazette* of Friday last, has reference to the conversion of the works of Messrs. Blews and Sons into a joint-stock company some four months since, and that those persons who have applied for shares will probably have their deposits returned.—*Birmingham Post.*

Gas Explosion in Sheffield.—An explosion of gas, which resulted in injury to two persons, and serious destruction of property, occurred on the 25th ult., at the Sovereign Inn, Rockingham Street. It appears that for some time there had been a considerable escape of gas in one of the rooms, from what source is not at present known. The landlord, Mr. John Williams, being unaware of this escape, took a lighted candle into the room during the afternoon, and the immediate consequence was an explosion. The room was very small and close, and had been carefully closed during the morning. The result was that two of the windows were completely blown out, and a door was smashed to pieces. The landlord was forced back against the wall, and burned about the head and face, and his son, who was standing near the door at the time of the explosion, was also seriously injured.

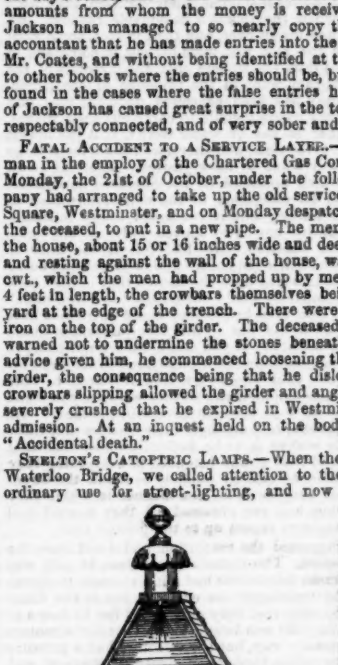
Aberdeen Corporation Gas-Works.—The profit realized in the manufacture of gas by the Aberdeen Town Council during the fourteen months ended on the 30th of September last was £2433 15s. 9½d. The consumption of gas has increased over 7 millions of cubic feet within the year. The leakage has been reduced 4 per cent., and is now reckoned to be about 14 per cent. The price of gas—5s. per 1000 cubic feet—is not to be raised, although the cost of coals has greatly advanced, the Gas Committee having contracted for a year's supply before the cost became so great as it now is, and they believe they will be able, judging from the appearance of the market, to obtain a future supply before it is required, at a not much increased rate. The illuminating power of the gas supplied has averaged 30½ to 30 candles—never falling so low as 29, and sometimes rising to 33.

Gas Lighting at Dunchurch, near Rugby.—This village was lighted with gas for the first time on Monday, Oct. 28. About two years ago a company was formed to undertake the work, but the high price of iron and labour prevented the scheme from being carried out. The promoters, subsequently, applied to Mr. Lancaster, M.P., for a supply of gas from his private works at Bilton Grange. Mr. Lancaster, with that public spirit which characterizes all his actions, consented to supply the company at a price to be fixed by arbitrators. The company then proceeded to lay mains from the works to the village, and on Monday week they had the satisfaction to bring their operations to a successful issue. In honour of the occasion, a dinner was given at the Dun Cow Hotel, to which about 60 persons sat down. Amongst the toasts which followed was the health of Mr. Lancaster, and also that of Mr. Peter Simpson, of Rugby, the engineer to the new company.

A Gas Collector Missing at Burnley.—On Monday, Oct. 14, a young man named Jackson, employed as gas collector by the Burnley Corporation, got leave of absence for four days, and was to have returned on the following Thursday. Several days passed over and nothing was heard about him, which led the borough accountant to examine the state of his accounts, the result being, as alleged, that there were defalcations found amounting to between £190 and £200. It appears that the collectors each evening give an account of the day's collections to the assistant-accountant, who enters the names and amounts from whom the money is received into a general receipt-book. Jackson has managed to so nearly copy the handwriting of the assistant-accountant that he has made entries into the general receipt-book unknown to Mr. Coates, and without being identified at the time, and references are given to other books where the entries should be, but there are no such entries to be found in the cases where the false entries have been made. The absconding of Jackson has caused great surprise in the town, as he was a very steady man, respectably connected, and of very sober and frugal habits.

Fatal Accident to a Service Layer.—William Gilson, aged 60, a workman in the employ of the Chartered Gas Company, was crushed to death on Monday, the 21st of October, under the following circumstances:—The company had arranged to take up the old service-pipe supplying a house in Smith Square, Westminster, and on Monday despatched three men, one of them being the deceased, to put in a new pipe. The men dug a trench in the courtyard of the house, about 15 or 16 inches wide and deep. Upon the edge of this trench, and resting against the wall of the house, was a huge iron girder weighing 15 cwt., which the men had propped up by means of three iron crowbars, each 4 feet in length, the crowbars themselves being upon the stones of the courtyard at the edge of the trench. There were also some heavy pieces of angle iron on the top of the girder. The deceased, while widening the trench, was warned not to undermine the stones beneath the iron, but, disregarding the advice given him, he commenced loosening the earth immediately beneath the girder, the consequence being that he dislodged one of the stones, and the crowbars slipping allowed the girder and angle iron to fall on him. He was so severely crushed that he expired in Westminster Hospital immediately after admission. At an inquest held on the body, the jury returned a verdict of "Accidental death."

Skelton's Catoptric Lamps.—When these lamps were first introduced on Waterloo Bridge, we called attention to their superiority over the lamps in ordinary use for street-lighting, and now that the authorities of the City of London have resolved upon a trial of their merits, we may again refer to the subject. The principle of the invention is the application of reflectors, by means of which the rays of light, that in common street-lamps are wasted, become utilized, and are distributed into the dark intervals between the lamps, and this too, without the dazzling effects produced by ordinary reflectors. The reflectors employed by the inventor are strips of silvered glass enclosed in a frame and glass case, so as to preserve them from dust and breakage. These strips are arranged to occupy the upper half of each side of the lamp and the whole of the sloping roof, as shown in the drawing, or they may be fitted in the roof only, and they are so placed as to reflect the light to any level, or to concentrate all the reflected rays on the ground, within a short distance of the lamp. In Moorgate Street, these lamps have been placed on one side of the way, so that a comparison between them and the old lamps may be readily instituted.



Robbery at the Phœnix Gas-Works.—At the Southwark Police Court on Wednesday, Oct. 23, George Pointer, a labourer, in the employ of the Phœnix Gas Company, was placed at the bar before Mr. Benson, charged with stealing about 45 lbs. of lead belonging to the company. It appeared from the evidence of Laming, a detective of the L division, that a little before six in the evening he saw the prisoner in Broadwall, carrying a basket that seemed very heavy. He suspected at once that something was wrong, and followed him into a marine-store dealer's, when he opened the basket, and placed two ingots and several lumps of lead on the counter. Witness at once asked him where he got it from. He replied: "A man whom I don't know just gave it to me to sell." Witness took him into custody, and on the way to the station-house he said: "I have told you a lie. I brought it from the works of the Phœnix Gas Company, Bankside, and I am very sorry for it." William Bundy, a detective officer of the same division, said that after the prisoner was locked up he searched his lodgings, and found several tools belonging to the company. James Braidwood, assistant-engineer in the employ of the company, said that he was called to the Tower Street police station, when he saw the prisoner in custody. He identified the lead as the company's property. The bars had the company's marks on them, and must have been taken from the stores in the course of the day. In answer to Mr. Benson, witness said the prisoner was a labourer, and worked with the main-layers. He had been in the company's employ four years. Mr. Woodall, the company's chief engineer, gave the prisoner an excellent character, and was surprised at his being in custody. The prisoner pleaded guilty, and said he was induced to take the lead by another man. He was very sorry, and it was his first offence. Mr. Woodall, on behalf of the company, strongly recommended him to mercy. He had been ten years in the army, from whence he was discharged with a good character. Mr. Benson sentenced the prisoner to three months hard labour.

Fatal Gas Accident at Mile End.—On Wednesday, Oct. 23, and following day, an inquest upon the body of George Press, aged 35, a watchman, who was suffocated by an escape of gas on the previous Saturday night in some cuttings for new gas-pipes in the Mile End Road, was resumed at the Vestry-hall, before Mr. Humphreys, coroner. The evidence of George Maggs and Thomas

Hawe, two other men who were rendered insensible, but were rescued, and also other witnesses, showed that some new pipes were being laid down in the Mile End Road by Messrs. Aird and Son, contractors for the Commercial Gas Company, and that the deceased was employed as a watchman in the tunnel that had been formed across the road to see that nothing went wrong underground. This tunnel was 7 feet deep by 5 feet wide. Two temporary joints had been made to the gas-pipes, but from some cause or other one of them became imperfect, and while the deceased watchman was in the tunnel on Saturday night last, about seven o'clock, the temporary joint gave way, and the gas from the works being full on, the unfortunate man, who was in the tunnel 3 feet from the mouth, was instantly overpowered and suffocated. The rush of gas was so strong that the outside watchman, Myddleton, was alarmed at the smell, and obtained the assistance of Maggs and Hawe, as he, having called to the underground watchman, could get no reply from him. These two men, on going to the assistance of their mate, also became insensible from the escaping gas. They were dragged out with a boat-hook and carried to a neighbouring surgery, where they eventually revived. On extricating the deceased he was found to be breathing his last. The inquiry, which lasted several hours each day, occasioned considerable interest. Among other witnesses, Mr. Knight, surveyor to the parish, said that if there had been a hole for the vent of the gas the man's life might have been saved; but then, he added, who ever heard of such an accident as this before? A juror thereupon asked whether it was not the business of engineers to guard against such contingencies. Witness replied, "Yes, when they are anticipated." Mr. Jones, chief engineer to the gas company, who was examined, said he did not think that if an aperture, or air-shaft, had been left at the other end of the tunnel it would have saved the man's life. He had seen three or four men rendered insensible directly even in an open cutting, so powerful is the gas when it rushes from the main. The coroner summed up at considerable length, and, after about half an hour's deliberation, the jury returned a verdict, "That the deceased died from the inhalation of gas, and that great neglect was attributable to the contractor for not having guarded against such a contingency as an escape of gas by providing another outlet for it." The jury said they trusted that the dangers elicited by the present inquiry would, through the press, be the means of preventing similar, and perhaps worse, catastrophes.

Hastings Water Supply.—The Hastings Town Council have confirmed a recommendation of their surveyor to extend the water supply by providing four extra reservoirs, capable of containing 1,500,000 gallons, at a cost of £5500.

The New River Company.—Some shares of this company are announced for sale by Messrs. Fox and Bousfield, and the *City Press* says it may be interesting to note that in 1870, when a similar sale took place, some remarkable prices were obtained. Thus, seventeen £100 new shares, fully paid up, realized an average of £195 per share; sixty-eight £100 shares, with £20 paid up, went for from £50 to £55 per share; six-twentieth parts of an undivided 36s. share, or King's moiety, realized £11,720; eight-sixteenth parts of a similar share, £9,240; and seven-twentieths, with two-thirtieths of another, £17,650.

Clitheroe Water-Works Company.—An extraordinary meeting of the directors and shareholders of this company was held in the town-hall, on the 28th ult.—Mr. W. B. Dewhurst in the chair—to consider an offer made to them, by the Corporation of Clitheroe, for the purchase of their works. The company has expended nearly £11,000 in their undertaking since it was established in 1854, and they are now paying a dividend of 8½ per cent. The corporation offers them a perpetual annuity at the rate of 9 per cent. on their share capital. Some years ago the company were willing to sell at 5 per cent. The town-clerk, who represented more than one-eighth of the whole capital of the company, spoke favourably for sale, and said the offer was a handsome one. The offer was not accepted, and a poll was taken of the votes and proxies.

Wrexham and Cefn Water-Works Companies.—A meeting of the Wrexham Water-Works Company was held on the 28th ult., for the purpose of considering a scheme for amalgamating that company with the Cefn Water-Works Company, of which Mr. G. H. Whalley, M.P., is the principal shareholder. In dry seasons the Wrexham Company find their supply unequal to the demand, whereas it is represented that the Cefn Company have a supply far in excess of their requirements. Mr. W. Overton, the chairman of the Wrexham Company, presided, and there was a very numerous and influential attendance. Considerable opposition was offered to the proposed amalgamation, it being contended by some gentlemen that the supply from the Cefn works would be by no means so large as was represented. After a long and animated discussion, however, a resolution was at length adopted in favour of taking the Cefn works at a valuation of about £1600. Rumour says they cost the honourable member for Peterborough about £6000. The opponents of the scheme objected that sufficient notice had not been given of the meeting and the business; and it was afterwards agreed to take the proxies of those shareholders who were absent, Friday next being fixed for the receipt of them.

Conviction for Wasting Water at Hereford.—At the police court, on Thursday, Oct. 24, John O'Hare was charged with having allowed the water supplied by the Hereford Town Council to run to waste, on the 8th inst., on premises in his occupation. Defendant admitted the water was running to waste on account of a stick having been placed under the handle of the closet tap, but denied all knowledge of the means by which it came there. He also pleaded that he had not complete control over the closet, as another house adjoined his, and the closet was common to both, besides the yard was always full of children, whom he could not prevent coming. The mayor observed that if he was going to plead ignorance of it the case should be adjourned till Monday, in order that the occupant of the other house should be summoned. Defendant then admitted that no one now lived there, as the tenant had left about a month ago, but again pleaded the impossibility of keeping strangers from going up the yard. Superintendent Davies said there was a passage up the side of one house, and a side door leading from it into the back yard, and the defendant could keep the side door closed; while the other house was empty he would have sole control over it. The mayor said the action that the Town Council was compelled to take was for the interest of the ratepayers in general, and as much for defendant's interest as that of anybody else. As to his plea of not being able to keep the door shut, he must do so as he was the only person liable, and if he wanted to be exempt from that liability he must keep it closed. However, they gave him credit for not having done it himself, and did not want to inflict a heavy punishment; he would therefore be fined 6d., and 8s. costs.

Pollution of the River Don.—On Thursday, the 24th of October, an adjourned meeting of the representatives of the Corporations of Sheffield, Rotherham, Barnsley, and Doncaster was held at the Victoria Station Hotel, Sheffield, for the purpose of considering what steps should be taken to prevent the pollution of the River Don by town sewage. The Mayor of Sheffield (T. Moore, Esq.) presided. After the town-clerk of Sheffield had read the section of the Health Act bearing on the object of the meeting, Alderman Fairburn pointed out that the Rivers Pollution Commissioners had not yet sent in their report, and that the whole matter of the disposal of sewage was still in a very unsettled state, and suggested the postponement of a decision on the question. The chairman thought the commission turned their attention more particularly to the pollution of rivers by manufacturing refuse. Alderman Guest (Rotherham) said that town suffered more severely than any other from the pollution of the Don, but he hardly yet thought the matter ripe for action. The Mayor of Doncaster said that they had spent nearly £50,000 in taking their own sewage out of the river, but their death-rate was still high, and would remain so as long as Sheffield and Rotherham poisoned the Don with their sewage, which, as a matter of course, came down to Doncaster. He hoped some satisfactory proposal would be made, or Doncaster must move in the matter. The Mayor of Sheffield, as a practical solution of the difficulty, moved that application be made to the Secretary of State for the formation of a united district for the purpose of carrying into effect the system of sewage. A rather warm discussion followed, and eventually the following resolution, proposed by the chairman and seconded by Mr. Harrison, was unanimously carried:—"That, in the opinion of this meeting, it is desirable that application be made to the Local Government Board by the Sheffield sanitary authorities for the formation of a united district, under the provisions of the 'Public Health Act, 1872.'" The meeting then separated.

Dr. Frankland and Major Bolton's Reports on the Condition of the Metropolitan Waters, for the Month of October, 1872.—Dr. Frankland, F.R.S., reports that all the metropolitan water companies delivered well-filtered, clear, and transparent water into the cisterns and butts of the consumers. Taking unity to represent the amount of organic impurity in the Kent Company's water, the proportion in an equal volume of water supplied by each of the other metropolitan companies was: New River, 1·1; West Middlesex, 2·5; Grand Junction, 2·9; Southwark and Vauxhall, 3·0; East London, 3·1; and Chelsea and Lambeth, each 3·2. The comparative freedom from organic impurity shown by the New River water is doubtless due to the "admixture of much spring and deep well water." The Kent Company's water is entirely derived from deep chalk wells. The Birmingham water during October was reported by Dr. Hill to be inefficiently filtered, and to contain a large proportion of "nitrogenized organic matter." Major Bolton, R.E., reports that the state of the Thames at Hampton, Molesey, and Sunbury, where the intake of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies is situated, was very satisfactory during the month ending the 15th inst. The river was also clear and bright at Ditton, where the Chelsea Company now alone draws its supply. Several of the water companies have new storeage reservoirs in course of construction, which will to a great extent obviate the necessity of taking in water when the condition of the Thames, from floods or other causes, is unsatisfactory; till recently the West Middlesex was the only company whose storeage capacity was adequate for this purpose.

Average Composition and Quality of the Metropolitan Waters, in October, 1872.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

Names of Water Companies.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
West Middlesex	16·67	0·031	0·147	0·000	13·0	3·3
Southwark and Vauxhall	17·83	0·067	0·101	0·003	14·0	3·2
Lambeth	17·07	0·060	0·147	0·002	13·8	3·6
Other Companies.						
Kent	27·27	0·018	0·245	0·000	20·3	5·2
New River	18·17	0·021	0·101	0·091	14·0	3·4
East London	17·39	0·028	0·167	0·002	13·6	3·6

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was slightly turbid—namely, in that of the Southwark and Vauxhall and the Lambeth Companies. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 114,696,589 gallons; and the number of houses supplied was 498,574. This is at the rate of 34·6 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 24 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne.

Hy. Letheby, M.B.

Register of New Patents.

3410.—Joseph Whitehead and William Foster, both of Blackburn, in the co. of Lancaster, for "*Improved hydraulic mains used in the manufacture of coal gas.*" Provisional protection only obtained. Dated Dec. 16, 1871.

The object of this invention is to do away with the dip during the time the gas is being evolved from the retorts, but to employ it when the retorts are being charged and discharged. Instead of placing the ends of the pipes from the retorts in stationary liquids contained in ordinary circular mains, as at present, the patentees employ rectangular mains, and place in each main moveable troughs containing water or liquid for the ends of the pipes to dip in, each trough being made of the length required for each bed of retorts, whether fives or sevens.

Each trough has at each longitudinal side four grooved wheels or rollers placed on vertical bars or guides fixed to the sides of the main, so that the trough can be raised for the dip and lowered when the gas is being evolved.

In one arrangement for raising and lowering the troughs the patentees employ below each trough two cross-bars fixed to the sides of the main, the bars having in the middle bearings carrying a shaft to which are fixed arms or lifters with steeled ends in contact with steel bars at the bottom of the trough, and to the shaft is fixed a crank connected by a rod to one arm of a two-armed lever working on a stud bolted to a standard fixed to the top of the main, the lever being worked by a rod and handle at the front of the bed of retorts.

When one arm of the lever is pulled by the rod and handle it raises the crank by means of the connecting-rod, and turns the shaft and lifters to raise the trough to give the dip to the pipes from the retorts; but when the movement of the lever is reversed the trough is lowered to allow the bottom of the pipes to be out of the liquid, and, for preventing any escape of gas from the main, the rod connected to the crank passes through a dip-pipe. When desired, instead of the crank and connecting-rod, the patentees fix on the shaft a chain wheel connected by a chain to a top lever, or they fix studs to the bottom of the troughs, and connect them by chains to overhead pulleys.

3416.—Alexander Melville Clark, of 53, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improved apparatus for generating and purifying gases for lighting and heating purposes.*" A communication. Patent dated Dec. 16, 1871.

The purifying apparatus is applicable to gas generators generally, but is preferably employed in combination with apparatus for producing gas by carburetting atmospheric air hereinafter described. The purifier consists of a cold water casing surrounding an inner casing containing absorbent material, through which the gas is caused to rise from the bottom in order to deprive it of the denser vapours. On leaving the purifier, the gas is conveyed to a heating apparatus for raising its temperature, which has been reduced in the refrigerator.

A modified arrangement of purifier is described for placing on the gas supply-pipes of the burners.

The gas is generated by carburetting atmospheric air with vapours of schist, petroleum or other matters. The jet supplied to the burner of the generating apparatus serves to heat the boiler containing the matters to be vaporized, and at the same time to introduce a current of air for mixing the same. The vapour is supplied under pressure for mixing with the air. The supply of the mixed gas is regulated by a counterbalanced bell chamber, which rises and gradually cuts off the supply of gas to the burner, when the quantity contained increases, and *vice versâ*. The apparatus is entirely self-acting.

3436.—James Alfred Wanklyn, of Harrington Street, Hampstead Road, in the co. of Middlesex, chemist, for "*Improvements in the manufacture of ammonia salts.*" Provisional protection only obtained. Dated Dec. 19, 1871.

The sewage of towns as it passes along the sewers has been found in certain stages of its progress to contain nearly all its combined nitrogen in the state of ammonia. It is proposed to utilize this ammonia by extracting it from the sewage by evaporation, and to absorb the vaporized ammonia by means of a suitable acid (by preference sulphuric acid).

APPLICATIONS FOR LETTERS PATENT.

3081.—Thomas Hoadley, of 36, Bedford Street, Reading, in the co. of Berks, for "*Improvements in lamps.*" Oct. 18, 1872.

3082.—Andrew Sweet, of 102, Hampstead Road, in the parish of St. Pancras, in the co. of Middlesex, for "*Meeting the requirements of water companies in respect of apparatus for flushing closets, urinals, and the like, without the necessity, as at present, of having the cistern above the place to be flushed, yet retaining the full pressure as on the main upon the water ejected.*" Oct. 18, 1872.

3093.—Robert Walker, of 4, Westminster Chambers, Victoria Street, Westminster, in the co. of Middlesex, contractor, agent, and inventor, for "*A new mode or method of applying atmospheric gas, spirituous vapour or gas, and impregnated combustible vapour or gas as a heating medium for the generation of steam or other purposes.*" Oct. 19, 1872.

3108.—John Peebles, of Errol, in the co. of Perth, N.B., for "*Apparatus for containing and supplying illuminating gas.*" Oct. 22, 1872.

3126.—Thomas Broun, of Newgate Street, in the co. of Middlesex, engineer, for "*Improvements in machinery for compressing air or gas, parts of which improvements are applicable to the pistons and piston-rods of steam-engines.*" A communication. Oct. 23, 1872.

3129.—William Henry Goss, of Stoke-upon-Trent, in the co. of Stafford, manufacturer, for "*Improvements in manufacturing articles of jewellery, dress ornaments, dress fastenings, smoke-shades for lamps and gas-burners, and the handles of cups and other vessels of ceramic materials.*" Oct. 23, 1872.

3153.—Samuel Chandler, sen., Samuel Chandler, jun., and Josiah Chandler, all of London Road, Southwark, in the co. of Surrey, gas engineers, for "*Improvements in apparatus to be used in the manufacture of gas.*" Oct. 24, 1872.

3156.—George Goldsmith and James Dilkes, both of Leicester, in the co. of Leicester, for "*Improvements in apparatus for roasting, baking, or cooking by gas.*" Oct. 24, 1872.

3180.—Abraham Malam, of Dumfries, in the co. of Dumfries, N.B., gas engineer, for "*Improvements in the manufacture of illuminating gas and in apparatus therefor.*" Oct. 26, 1872.

3192.—Edward Primerose Howard Vaughan, F.C.S., of 54, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in the mode of and apparatus for generating gas for lighting and heating purposes.*" A communication. Oct. 28, 1872.

GRANTS OF PROVISIONAL PROTECTION.

2976.—William Durie Fisher, of the city of Glasgow, in the co. of Lanark, N.B., engineer, for "*Improvements in apparatus for and connected with the manufacture and use of illuminating gas, parts of which are applicable to other purposes.*" Oct. 10, 1872.

3005.—Charles Lowe, of Reddish, in the co. of Lancaster, manufacturing chemist, for "*Improvements in the treatment of coal-gas tars for the purpose of obtaining certain useful products therefrom.*" Oct. 11, 1872.

3008.—William Ferrie, of the Monkland Iron and Steel Works, Airdrie, in the co. of Lanark, N.B., for "*Improvements in applying combustible gases obtained from smelting-furnaces or from gas-producers, for heating puddling and other furnaces, and in apparatus connected therewith.*" Oct. 12, 1872.

3012.—Edward Davies, of Liverpool, in the co. of Lancaster, for "*Improvements in hydraulic machinery for obtaining, utilizing, transmitting, and applying motive power.*" Oct. 12, 1872.

3033.—Edmund Alfred Pontifex and John Barton, both of the Farringdon Works, Shoe Lane, in the City of London, engineers, for "*Improvements in water-waste preventers.*" Oct. 15, 1872.

3038.—Frederick George Underhay, of Crawford Passage, Clerkenwell, in the co. of Middlesex, for "*Improvements in water-waste preventers.*" Oct. 15, 1872.

3037.—James John Shedlock, of 1, Ellenborough Road, Upper Holloway, in the co. of Middlesex, engineer, for "*Improvements in apparatus for the treatment of hydrocarbon gases and vapours for illuminating and heating purposes.*" Oct. 16, 1872.

NOTICES TO PROCEED.

1914.—Joseph Townsend, of Glasgow, in the co. of Lanark, N.B., manufacturing chemist, for "*Improvements in furnaces or apparatus for obtaining heat or gases from coal or other substances containing carbon.*" June 25, 1872.

1953.—Henry Giroud, of Paris, department of the Seine, in the French republic, merchant, for "*A new and improved rheometric regulator for gas-burners.*" June 28, 1872.

1990.—Henry James Hogg King, of Glasgow, in the co. of Lanark, N.B., engineer, for "*Improvements in apparatus for obtaining motive power for pumping or for measuring fluids.*" July 2, 1872.

2487.—William Young, manager of the Chemical Works, Magdalen Bridge, Peter Brash, of Leith, soap, candle, and oil manufacturer, and Andrew Scott, manager of the Musselburgh Gas-Works, Musselburgh, all in the co. of Mid Lothian, for "*Improvements in the destructive distillation of coal, shale, and other bituminous substances for the production of illuminating gas and of oils.*" Aug. 21, 1872.

Share List of Metropolitan Gas Companies.

(*Corrected by Mr.* F. N. Golding, *Sun Court, Cornhill, from the latest Stock Exchange Quotations.*)

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£		£ s. d.	£ s. d.	£
8000	20	Anglo-Romano	20 0 0	10 0 0	20 — 22
5000	20	Bahia (Limited)	20 0 0	3 0 0	11½— 12
1000	20	Do., preference	20 0 0	10 0 0	23 — 25
750	20	Do., do., redeemable	20 0 0	10 0 0	21 — 23
40000	5	Bombay (Limited)	5 0 0	6 15 0	5⅞— 6⅛
10000	5	Do., third issue	4 0 0	6 15 0	½—1 pm.
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge., and Holywell.)	20 0 0	10 0 0	33 — 35
7500	20	Cagliari (Limited)	20 0 0	7 0 0	19 — 20
120000	10	*Chartered* A shares	10 0 0	10 0 0	15½— 15⅝
10000	10	Do., B shares, 4 per cent. max.	10 0 0	4 0 0	6⅝— 7
25000	10	Do., 5 per cent. preference	10 0 0	5 0 0	12¼— 12½
20000	10	Do., 5 per cent. preference, second issue	8 0 0	5 0 0	2⅞—3¼ pm.
20000	10	Do., 10 per cent. preference	10 0 0	10 0 0	19 — 20
12000	25	Do., D shares	25 0 0	10 0 0	— 49
17490	100	*Commercial*	100 0 0	10 0 0	156 —158
20000	20	Continental Union	20 0 0	8 0 0	21½— 22
10000	20	Do., new	10 0 0	8 0 0	1 —1½ pm.
10000	20	Do., preference (Grmny.: Strsbg. France: Cette, Nismes, Montargis Vienne, Roanne, Beaucaire, Rueil, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	23 — 25
5000	10	*Crystal Palace District*	10 0 0	10 0 0	15½— 16½
5000	10	Do., preference	10 0 0	6 0 0	11½— 12
6624	10	Do., new shares	10 0 0	7 0 0	13½— 14½
3376	10	Do.	1 0 0	7 0 0	1—1½ pm.
23406	10	European (Limited)	10 0 0	8 0 0	14¼— 15
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	8 0 0	2½—2⅝ pm.
5000	10	Hong Kong (Limited)	10 0 0	10 0 0	12½— 13½
1560000	100	*Imperial*	100 0 0	10 0 0	162 —164
26000	12½	Do., new shares	12 10 0	7 0 0	15 — 16
1300	100	Do., bonds	£100	10 0 0	195 —200
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam., Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	9 2 6	64 — 66
3000	40	*Independent*	40 0 0	10 0 0	64 — 66
3000	10	Do.	10 0 0	5 0 0	7 — 8
3000	20	Do.	20 0 0	7 10 0	24 — 25
250000	Sk.	*London*	100 0 0	10 0 0	155 —160
£15000	Sk.	Do., 1st preference	100 0 0	6 0 0	116 —118
	Sk.	Do., 2nd preference	100 0 0	6 0 0	
	Sk.	Do., 3rd preference	100 0 0	6 0 0	
£18781	100	Do., 1st preference stock	100 0 0	6 0 0	
£11828	100	Do., 2nd preference stock	100 0 0	5 0 0	
15000	5	Malta and Mediterranean (Limited)	5 0 0	5 0 0	3⅞— 4⅛
6000	5	Do., preference	5 0 0	7 0 0	5⅛— 5⅜
20000	5	Mauritius (Limited)	2 0 0	7 0 0	2¼— 2⅜
25000	20	Monte Video (Limited)	20 0 0	—	⅛dis.—¼pm.
8000	10	Nictheroy, Brazil (Limited)	10 0 0	—	1⅛—1¼ dis.
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6⅞— 7⅛
30000	5	Do., new shares	2 10 0	9 0 0	1—1½ pm.
10000	5	Ottoman (Limited)	5 0 0	nil.	2 — 3
17500	10	Pará (Limited)	10 0 0	6 0 0	10 — 10½
27000	20	*Phœniz*	20 0 0	10 0 0	32 — 34
3600001.	100	Do., new	45 0 0	7 10 0	13—15 pm.
1440001.	Sk.	Do.	100 0 0	5 0 0	89 — 91
5000	20	*Ratcliff*	20 0 0	10 0 0	31 — 33
34000	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	36 — 38
7359	5	Singapore (Limited)	5 0 0	7 10 0	5 — 5¼
2000	5	Do., preference	5 0 0	7 10 0	5¼— 6
1500	32½	Shanghai	32 10 0	12 6 0	
4000	50	*South Metropolitan*	50 0 0	10 0 0	82 — 84
4000	12½	Do.	12 10 0	10 0 0	20 — 21
20000	12½	Do., new shares	2 10 0	10 0 0	4—5 pm.
15000	10	*Surrey Consumers*	10 0 0	10 0 0	15½— 16
10000	10	Do., new	6 0 0	10 0 0	4 — 5
9000	4	United General (Limerick)	4 0 0	5 0 0	2¼— 2½
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	13 — 14
1500	10	Do.	10 0 0	7 10 0	7¼— 8
1819	10	Do.	10 0 0	7 10 0	
1138	10	Do.	5 0 0	7 10 0	
40000	10	Western (Limited) A, B, & C shares	10 0 0	10 0 0	15 — 16
20000	10	Do., D shares	1 0 0	10 0 0	2⅜—3½ pm.
16000	5	*West Ham*	5 0 0	9 0 0	7¼— 7½
10000	5	Do., new shares	1 0 0	9 0 0	1¼— 1½

Advertisements.

LIVESEY FIRE-CLAY WORKS,
NEAR BLACKBURN, LANCASHIRE.
(ESTABLISHED 1835.)

ORLANDO BROTHERS,
MANUFACTURER OF PATENT CLAY RETORTS,
AND EVERY DESCRIPTION OF
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.
FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

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GAS & WATER ENGINEERS.

CONTRACTORS FOR THE SUPPLY OF

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AND

75, UNION STREET, GLASGOW.

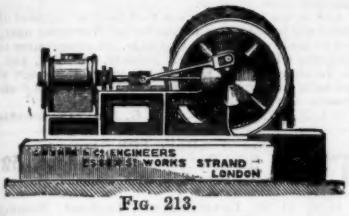

FIG. 213.

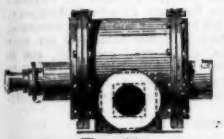

FIG. 211.

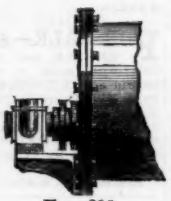

FIG. 219.

GWYNNE & COMPANY,

HYDRAULIC, MECHANICAL, & GAS ENGINEERS,

ESSEX STREET WORKS, STRAND,

London, W.C.,

SOLE MANUFACTURERS OF

BEALE'S IMPROVED PATENT GAS-EXHAUSTER,

Under the personal superintendence of Mr. BEALE.

REDUCED PRICES AND INCREASED CAPACITY.

Also manufacturers of Improved Hydraulic Regulators, to actuate a steam or gas throttle-valve to suit the make of gas; self-acting bye-pass valves, to move by hand or otherwise; improved stop-valves, with faced flanges, forming the neat adjunct to Exhauster of valve and elbow combined. Exhausters manufactured on the new principle have given the utmost satisfaction, and can be seen working at several large Gas-Works in London. G. & Co. are now engaged in manufacturing the largest Gas-Exhausters in the world, with engines complete.

The Gas-Exhausters may be made with inside or outside bearing, as shown in Figs. 211 and 219.

Fig. 213 shows the Improved Gas-Exhauster attached to, and driven by one of GWYNNE AND CO.'s well-known high-speed Horizontal Steam-Engines, without any intermediate gearing. This arrangement is extremely compact, and is beautifully adapted for small or large Gas-Works, and the foundations and erection are both very simple and inexpensive.

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LESMAHAGOW GAS COAL.

The superior quality of this well-known Cannel, as wrought by

THE NITSHILL AND LESMAHAGOW COAL COMPANY,

Is now generally admitted by all Gas Engineers.

PRICE AND ANALYSIS MAY BE HAD ON APPLICATION TO

JAMES M'KELVIE, HAYMARKET, EDINBURGH.

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GAS-METER MANUFACTURERS, BRASSFOUNDERS & FINISHERS,

ATLAS METER-WORKS, OLDHAM.

CONSUMERS GAS-METERS ON THE MOST APPROVED PRINCIPLES.

STATION-METERS, GOVERNORS, PRESSURE-REGISTERS,

And every Description of Gas Apparatus.

GAS, STEAM, AND WATER FITTINGS.

CANNEL COAL.

ELLIS, LEVER, & CO.,

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ENGLISH, SCOTCH, & WELSH CANNEL COALS.

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OF THE

RYDE GAS ARBITRATION.

By R. P. SPICE.

With a Plan of the Works.

DEDICATED

TO THE

DIRECTORS of the GAS COMPANIES

AND THE MEMBERS OF THE

LOCAL BOARDS OF THE UNITED KINGDOM,

BY THEIR HUMBLE SERVANT,

THE AUTHOR.

21, PARLIAMENT STREET,
Aug. 12, 1872.

London: EDWARD STANFORD, 6 & 7, CHARING CROSS, S.W.

Ryde: E. & M. A. GIBBS, UNION STREET.

EDGE'S PATENT

FOR REMOVING THE

CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

"*Gas-Works, Leicester, Oct.* 26, 1870.

"Dear Sir,—I have used Edge's patent process for scurfing the Retorts at these works during the last twelve months, and I have great pleasure in testifying to its efficiency and economy; it is exceedingly simple, and can very readily be applied.—I am, dear sir, yours truly,

"E. Goddard, Esq." "ALFRED ROBINSON.

For particulars and terms, apply to E. GODDARD, Sole Agent, Gas-Works, IPSWICH.

WANTED, a Working Foreman of GAS-FITTERS. None but thoroughly competent persons need apply.

Address, by letter only, to the MANAGER, the University and Town Gaslight Company, CAMBRIDGE.

Oct. 28, 1872.

YSTRAD GAS AND WATER, GLAMORGANSHIRE.

WANTED, a Manager and Collector for these small but increasing works.

Further information may be obtained on application to me.—By order, FRANK JAMES, Secretary.

134, High Street, Merthyr Tydfil, Oct. 30, 1872.

WANTED, a situation by a middle- aged man, as MANAGER of a small country Gas-Work. Can lay mains, services, and read index of meters, and set iron retorts. Seven years in last place. Can have a good character.

Address, J. M. R., 109, Southam Street, Upper Westbourne Park, PADDINGTON.

WANTED, by a young Man, aged 31, a position of TRUST. Thoroughly understands the superintending of main and service laying, taking meters, and all other duties required in a Gas-Work. Has had 3½ years practical experience in China. First-class reference and testimonials. Country preferred.

Apply to W. N., J. Measeock and Co., 15, Giltspur Street, LONDON, E.C.

WANTED, by a company in a provincial town, a GAS-FITTER. Must be competent to read meters well, attend to complaints, fix meters and put up fittings, and lay services. If found suitable, the employment will be permanent.

Applications, in own handwriting, stating age, last employment, and wages required, with references as to character and ability, to be addressed to C. G. S., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO FOREIGN GAS COMPANIES.

WANTED, by a thoroughly practical Man of sober and well-conducted habits, a situation as GENERAL FOREMAN or ASSISTANT MANAGER. Is well acquainted with the manufacture and distribution of gas, main and service laying, fitting, keeping accounts, &c. The Advertiser being acclimatized, a situation in the tropics preferred.

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TO GAS-WORKS MANAGERS.

WANTED, by the Heckmondwike Gas Company, a GENERAL MANAGER who is fully qualified to conduct the manufacture and distribution of gas, and to take the entire control of the works in all branches. Must have had the management of similar works before.

Apply, with testimonials and amount of salary required, to Mr. GEORGE BURNLEY, Chairman, or Mr. BOOTH, Secretary of the Company, Heckmondwike, *viâ* Normanton.

WANTED, a situation as Manager of moderate-sized works (say 30,000,000 or 40,000,000) or FOREMAN in larger works, or in any capacity where a thorough practical knowledge and considerable experience in the manufacture of gas can be made available. The Advertiser has held his present situation for some years, but is anxious to enter upon another where there is greater scope for the improvement of his position. Excellent testimonials.

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ANALYSES OF GAS COALS, PHOTO- METRY of GAS, OILS, and CANDLES, and Researches connected with the Chemistry and Photometry of Gas Lighting.

Conducted by DR. WALLACE,
Consulting and Analytical Chemist, and Gas Examiner for the City of Glasgow.

GLASGOW: CHEMICAL LABORATORY, 42, BATH STREET; GAS LABORATORY, 29, ALSTON STREET.

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BY

MAGNUS OHREN, A.I.C.E.

NEW AND REVISED EDITION.

Prepared for Gas Companies to circulate amongst their gas consumers.

£1 per 100; £3 15s. per 500; or £6 per 1000.

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A Young Man, who thoroughly under- stands the repairing and fixing of Wet and Dry Gas-Meters, taking of Indexes, and attending to complaints, requires a SITUATION as above. Nine years character.

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STATION-METER for Sale, to pass 6000 feet per hour. Is of the best description, and nearly as good as new (by Laidlaw).

Apply to Shotley Bridge and Consett District Gas Company, Green Street, SHOTLEY BRIDGE.

FOR SALE, good as new (having been refitted by a well-known firm), a quantity of 12-in., 10-in. and small sized SLIDE-VALVES. Also two 18-in., one 10-in., and one 8-in. GOVERNORS in good condition. A low price will be accepted to effect a clearance.

WANTED, two PURIFIERS about 4-ft. square, and a STATION-METER to pass 2000 feet per hour.

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COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS.

As these Sheets are now out of print, modifications, if desired, can be made in the New Edition to suit the system or convenience of those using them.

W. J. WARNER, ENGINEER.

South Shields, Oct. 1.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 43, Parliament Street, WESTMINSTER.

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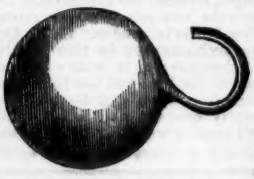
CATOPTRIC LAMP,
for Streets and all Situations where the Light ascending above the level of the Lamp is wasted,
Is now in use in Moorgate Street, London, and has been in successful operation upon Waterloo Bridge, since Oct. 7, 1871.

T. A. SKELTON, 37, Essex St., Strand, LONDON,
INVENTOR AND PATENTEE.

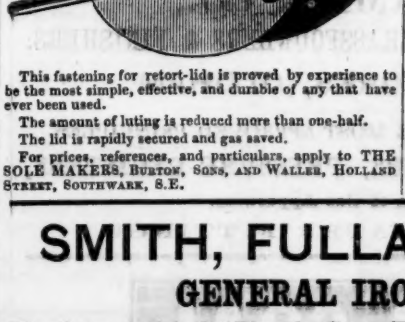
CLOTH GAS-BAGS FOR MAINS,



As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber and Gutta-Percha Machine-Bands, Sheet and Washers for Steam Joints.

T. BUGDEN, Manufacturer,
79, GOSWELL ROAD, LONDON, E.C.

BOX'S PATENT FASTENING.



This fastening for retort-lids is proved by experience to be the most simple, effective, and durable of any that have ever been used.

The amount of luting is reduced more than one-half.

The lid is rapidly secured and gas saved.

For prices, references, and particulars, apply to THE SOLE MAKERS, BURTON, SONS, AND WALLER, HOLLAND STREET, SOUTHWARK, S.E.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

(INCORPORATED BY ACT OF PARLIAMENT.)

NOTICE is hereby given that the HALF-YEARLY ORDINARY MEETING of the Proprietors of the Imperial Continental Gas Association will be held at the City Terminus Hotel, Cannon Street, London, on TUESDAY, the 26th inst., at Two o'clock in the afternoon precisely, when a Report will be made to the Proprietors, a Dividend declared for the half year ended the 30th of June, 1872, and the usual ordinary business of such meeting transacted.

Notice is hereby also given that the Transfer Books of the Association, and the Register of Shareholders, will be closed on Tuesday, the 12th inst., and will remain closed until after the Half-Yearly Ordinary Meeting on the 26th inst.—By order of the Board of Direction,

ALBERT F. JACKSON, Secretary.

30, Clement's Lane, Lombard Street,
London, Nov. 4, 1872.

CADIZ WATER-WORKS COMPANY, LIMITED.—£10 PREFERRED SHARES.

NOTICE is hereby given that the Directors have resolved to PAY to the holders of the Preferred Shares the INTEREST at the rate of 7 per cent. per annum, which, under the terms of the Prospectus, becomes payable on each instalment from the date of the payment thereof until the works are completed, quarterly, on the 1st of November, the 1st of February, the 1st of May, and the 1st of August.

To secure the due payment thereof the sum of £21,621 12s. 6d. Consols has been invested, and now stands in the names of three Trustees.

And notice is further given that the first payment of interest will become due on the 1st of November next, and will be made on and after that date, on presentation to the Company's Bankers, Messrs. Robarts, Lubbock, and Co., 15, Lombard Street, E.C., of the interest warrant which has been forwarded to each holder of the £10 Preferred Shares.—By order of the Board,

Oct. 28, 1872. B. G. KINNEAR, Secretary.

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FOR SALE.—A 5-H.P. Vertical Steam- ENGINE, and two 5-H.P. CORNISH STEAM-BOILERS, made by the Reading Ironwork Company; an 8-in. GOVERNOR, with bye-pass and valves complete, by A. Wright and Co.; and a 20,000 cubic feet per hour EXHAUSTER, by Beale, all in good condition, and at present in use. The Engine and Boilers may be had in September, and the Governor at once.

Particulars as to price, &c., may be obtained of Mr. BAKER, Engineer.

Reading Gas-Works, June 15, 1872.

Mr. ALFRED LASS,

27, WALBROOK, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

SAMUEL PONTIFEX, Consulting Gas Engineer, having retired from the Great Central Gas Company, is now prepared to furnish PLANS and SPECIFICATIONS, as well as ADVISE Provincial Gas Companies as to the erection of new, or alteration and enlargement of existing works.

Offices: 22, Coleman Street, LONDON, E.C.

J. T. B. PORTER & A. SILVERTHORNE, C.E., 1, Westminster Chambers, LONDON, S.W., Consulting Engineers.

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ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

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N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

SMITH, FULLARTON, & CO.,

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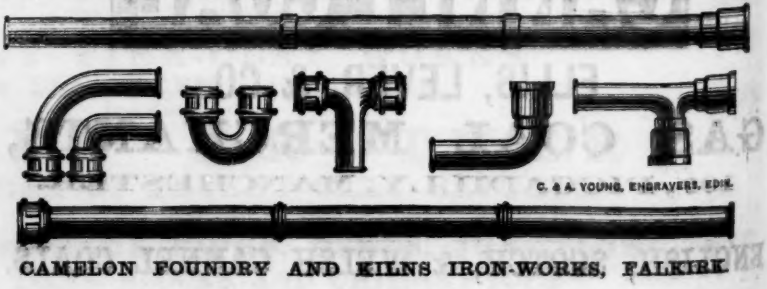
Manufacturers of Socket-Pipes for Gas or Water, Hot Water-Pipes and Connexions, &c.



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PATENT PLATINUM

GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

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"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

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To be had retail of Gas-Fitters and Ironmongers.

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Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

** Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.

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TESTIMONIALS.

"*Consumers Gas Company, Weymouth, March* 8, 1872.

"Dear Sir,—I am pleased to bear testimony to the great superiority of your Patent Double-Clip Lamp over those we have hitherto had in use. Nearly twelve months ago I had 72, and they have given me perfect satisfaction in every respect. The free circulation of air, consequent upon the glass being placed in without putty, ensures a very and unusual steadiness of flame. There is a great saving in glass, as we now seldom get the glass broken, and the Frames are largely protected from the influence of the weather by the Clips. Altogether, I consider them better far and much more economical than those generally in use.—I am, yours faithfully,

(Signed) "THOMAS STONE, Engineer and Manager."

"*Gas-Works, Wellington, Somerset, April* 26, 1872.

"Dear Sir,—Your Patent Double-Clip Lamp is much approved, both by my Directors and the Public Gas Inspector; of neat appearance, well ventilated, but few breakages, easily repaired, and that by the Lamplighter himself, requiring no putty; and as they can be made of any size, and to any pattern, they leave but little to be desired in a public street lamp.—I am, dear sir, yours very truly,

(Signed) "HENRY G. CROWE, Manager."

FOR FOREIGN GAS COMPANIES THEY ARE INVALUABLE. For particulars, apply to—

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ROBERTSON STREET, HASTINGS, SUSSEX.

SAM. CUTLER & SONS,

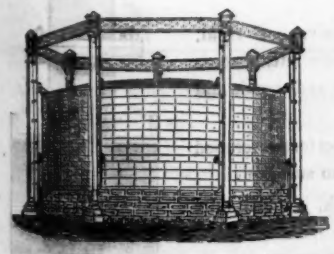
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

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WORKS FOR THE SUPPLY OF

VILLAGES, MANSIONS, FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water**, and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

D. GRANT & CO.,

WET & DRY GAS-METER MANUFACTURERS.

STATION-METERS ANY SIZE,

PHOTOMETERS, EXPERIMENTAL METERS, &c.

GAS-METER WORKS, CROSS CAUSEWAY, EDINBURGH.

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AND

1, WESTMINSTER CHAMBERS, VICTORIA STREET, S.W.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

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BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

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These Sieves are made with parallel or bevel bar, and guaranteed to be well seasoned yellow deal, and not common spruce so generally used.

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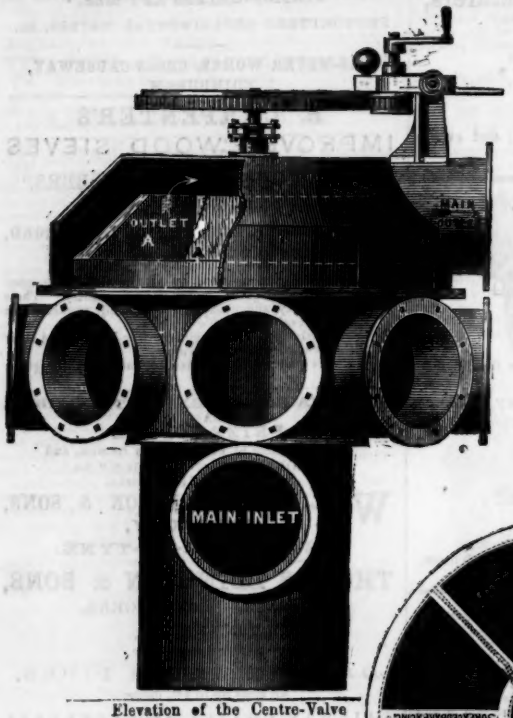
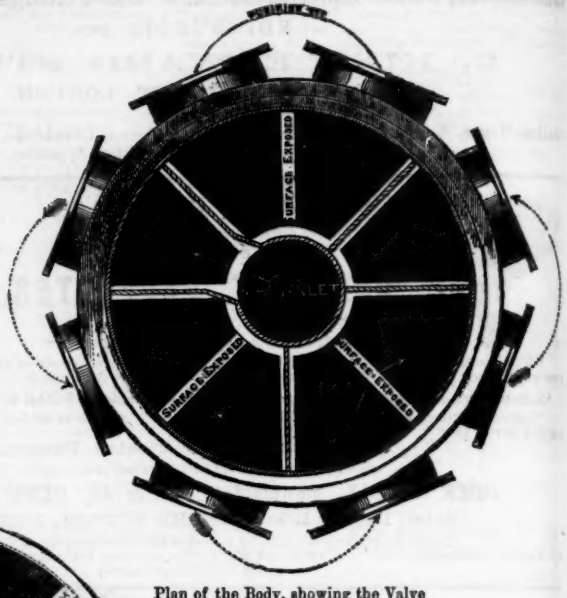
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.

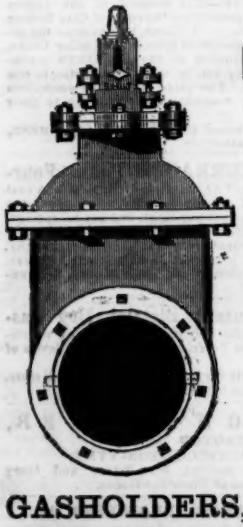


Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)

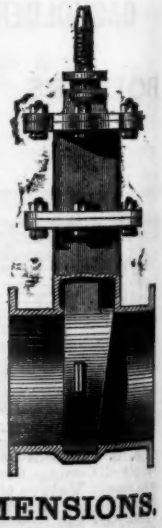
Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.



C. & W. WALKERS'
DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

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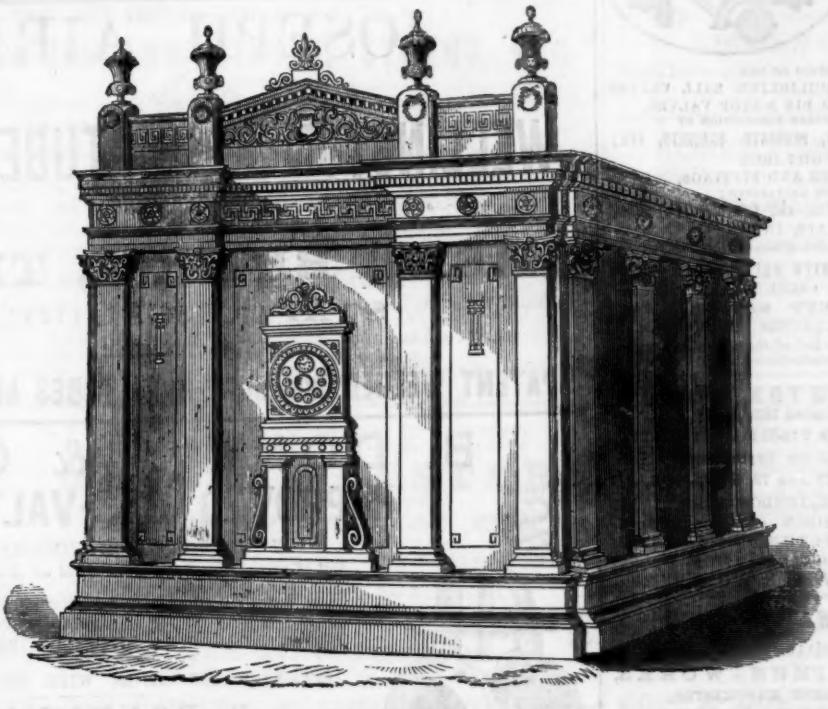

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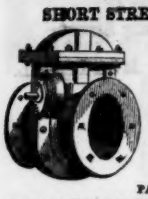

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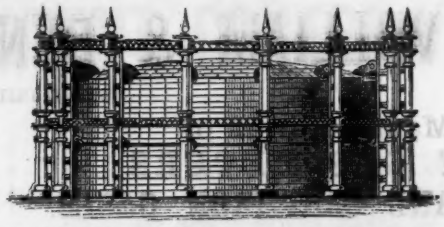

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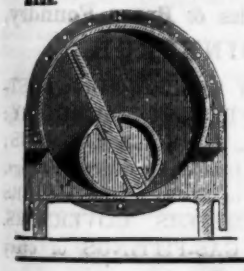

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This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

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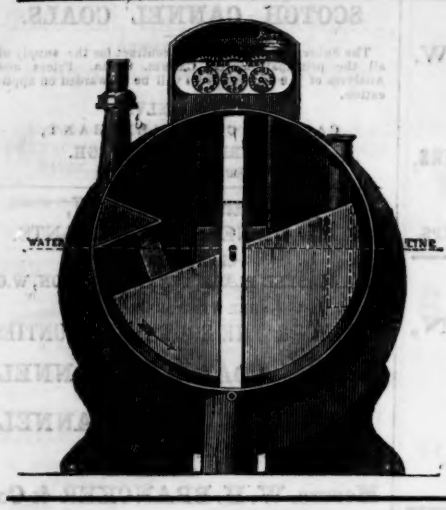

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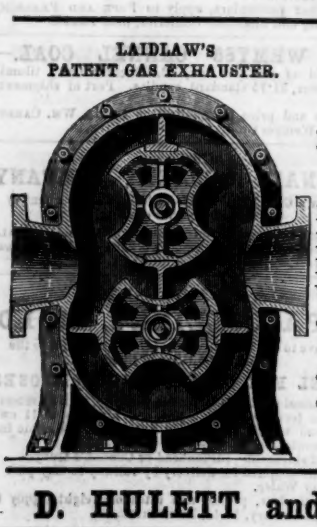

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